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TIGERPAPER is a quarterly news bulletin dedicated to the exchange of information relating to wildlife and national parks management for the Asia–Pacific region. TIGERPAPER is compiled, edited and distributed by Roseline Beudels, Acting Regional Wildlife and National Parks Management Officer, under the FAO Regional Priority Programme for Asia and the Far East, with assistance by Janice Naewboonnien. Financial assistance is provided by UNEP.

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Back cover: A hatchling Saltwater crocodile, Bhitar Kanika Sanctuary, Orissa, India. (Photo: Bustard)

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EDITORIAL

We are very pleased indeed to inform you that, although we have been facing some financial difficulties, the future of the **TIGERPAPER** is now assured for another two years.

As my predecessor Jaap Kuper left a few months ago, before my arrival, I will have to make the introductions myself! My name is Roseline Beudels, I am a young Belgian biologist with some experience from Africa and from the United Kingdom where I have been working recently. This is my very first assignment in the Asia–Pacific region, and I will therefore need all of your assistance and contributions for a successful continuation of **TIGERPAPER**.

You know that **TIGERPAPER** is what the readers make out of it; this means that I will be essentially dependent upon your voluntary cooperation to keep it going successfully.

So, please, keep supplying me with any information that you have in the field of wildlife and nature conservation of interest to the Asia–Pacific Region. We are happy to inform you that any articles that you send to us which are published will be read by approximately 2,200 persons, all directly interested in conservation, wildlife and national parks management.

People concerned with conservation cannot remain isolated anymore, and one of the objectives of TIGERPAPER has always been to serve as a link for a better regional and even mondial cooperation for all the conservation problems.

It should not be necessary for me to introduce you to Janice Naewboonien, since she has been actively working on the production of **TIGERPAPER** for two years already. Together then, and with your help, we hope that **TIGERPAPER** will continue to keep you informed on activities in the Region so that you will know what is being accomplished by others in the field of wildlife and national parks management.

Roseline Beudels

WILDLIFE LEGISLATION IN THE PHILIPPINES

by Amado S. Tolentino, Jr.

Years ago, the Philippines had a rich variety of wildlife including many species of birds, reptiles and mammals. With the occurrence of the second World War all laws concerning wildlife preservation were forgotten and the citizenry was forced to take game for survival. After the war, the armed population increased but there was no effective restoration of game laws or of wildlife conservation consciousness. Wild birds were not only hunted as game but used as "targets". (Since the promulgation of Proclamation No. 1081 declaring martial law in the country, hunting has been prohibited. It is hoped that with the hunting ban, the wildlife population will increase.)

Game and Fish Law

The earliest wildlife legislation framed in the Philippines was Act No. 2590 of the Philippine Legislature enacted on February 4, 1916. Entitled "An Act for the Protection of Game and Fish", it rendered unlawful "to hunt, wound, take or kill, or have in his or her possession, living or dead, or the purchase, offer or expose for sale, transport, ship or export, alive or dead, any protected bird or mammal. . . . or wilfully destroy the nest or eggs of any protected bird or to have such nest or eggs in his possession" except as provided in the Act.

The term "protected bird" includes insect–eating birds, song birds, game birds and generally all wild birds. This early game law also prescribed when birds may be destroyed, the establishment of a closed season for hunting, acquisition of a hunting license and permits to collect specimens of protected animal life. Specifically, wild pigs may be taken or killed in any manner at any season of the year and without license; monkeys, wild cats and other mammals not mentioned herein may be caught or destroyed by property owners at any time that such animals cause destruction to their property (Sec. 14, Act 2590). This was quite understandable within the context of the system of administration and society prevalent three decades ago. Hunting and the enjoyment of wildlife was the privilege of the few and was never deemed to be for the common man.

Act 2590 covered only game species of birds and animals. Non–game animals, birds and reptiles, which in the case of the latter two meant most of the species as well as butterflies, fish and other vertebrates and non–vertebrates, were almost totally ignored.

In terms of protection, the species on the list of endangered wildlife in the country are given priority. The remaining population is also protected and is being helped to propagate. These are the tamaraw (Bubalus mindorensis) (CA No. 73 as amended by RA 1086) and the Philippine eagle (Pithecophaga jefferyi) (RA No. 6147). A conservation program for the tamaraw in Mindoro was first launched in 1969.

But while there exists a law prohibiting the slaughtering of male and female carabaos, horses, mares and cows (RA No. 11), such a law was passed primarily to preserve them as work animals, the country being basically agricultural. President Ferdinand E. Marcos, by virtue of Executive Order No. 234, dated May 16, 1970 prohibited the slaughter of carabaos and buffaloes in order to boost the country's production program. Further proof of the country's concern for the carabao as the number one work animal is a series of

Red jungle fowl (Photo: Hum. Sett. Off. Dev. Acad. of the Philippines)

laws on rinderpest control. Rinderpest is an acute infectious disease characterized by fever and inflamation of the mucous membrane of the intestines of carabaos and cattle. Act No. 2548 provided for the immunization of cattle and carabaos to prevent the spread of rinderpest within the Philippines and Act 3166 as amended by Act 3825 provided for the use of rinderpest vaccine in the control of rinderpest and other contagious and infectious cattle diseases. Act No. 2172 even authorized the Director of Animal Husbandry to declare under quarantine any place in the Philippines which is infected with any infectious, contagious and communicable disease which is a threat to the health of the work animal.

Aside from the enumerated laws, the Philippines has entered into a number of international agreements not only on wildlife conservation but also on problems threatening wild life resources. Among these are:

Parks Law

With the increase of human population resulting in greater demands for land and the rapid decimation of wildlife, enactments establishing national parks, sanctuaries and reserves were promulgated. The reason is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. This is with the hope that park visitors will seek to enjoy nature, relax, play and develop a better understanding of their relationship to the environment.

On August 14, 1952, Congress of the Philippines passed RA No. 826 also known as "An Act Creating the Commission on Parks and Wildlife" specifically "to promote, conserve, maintain and regulate the use of national parks, national monuments and wildlife in said parks, of game and fish, game refuges, bird sanctuaries and game farms, and to provide assistance to, and cooperate with the provinces, chartered cities, municipalities and municipal districts in the establishment and conservation of provincial city, municipal district parks and monuments by such means and measures as conform to the fundamental purpose of the said parks, monuments and game and fish, game refuges, bird sanctuaries, and game farms, which purpose is to conserve the area and the wildlife therein, including birds, fishes, mammals, and other animals and to provide for the enjoyment of the same by all.

Conclusion

It will be noted that the parks and wildlife laws discussed above concern themselves mostly with only the main animals leaving out the all–important flora habitat. This vacuum is particularly significant in in respect to parks where the endeavour should be made to conserve wildlife to its widest and fullest extent. There is also the implication that a citizen is free to exploit the fauna and flora unless specifically prohibited from doing so under the game law or other enactments of the country.

Proper wildlife education of the people should also be undertaken by the government. Wildlife's contribution not only to the ecology but also to the economy should be emphasized. It cannot be denied that furs and hides used by the garment and tanning industries derive their raw materials from the wildlife resources. These wildlife also contribute to the advancement of medicine since they are used as an

Deer (Photo: Hum. Sett. Off. Dev. Acad. of the Philippines)

experimental medium in the manufacture of drugs. Salk vaccine from certain monkeys is said to give protection against polio. Even the scaly ant eater of Palawan is being considered as a possible source for the treatment of leprosy.

Among others, the following recommendations are hereby made to aid our legislators in making policies covering our wildlife:

1. Philippine legislation on wildlife has been too species–oriented instead of area–oriented. While an area can be protected without the animals, the animals themselves cannot be protected in a state of nature without their natural habitat. Our conservation program should put as much emphasis on the protection of the habitats of the species.
2. Wildlife legislation should recognize the concept of zoning of national parks and protected areas wherein some zones would be demarcated for touristic or multiple land–use purpose, while others would be set aside for strict nature conservation. In short, the law should include conservation involving the management of both animate beings and areas.
3. The Parks and Wildlife Office, should cooperate in a wide range of activities with universities, public and private school systems, citizen groups, communities and various government agencies to promote a fuller appreciation of the national park concept and to increase public understanding of the need to protect and enhance our environment.
4. As regards hunting, legislation must cover all aspects of hunting including snaring, netting, collecting of eggs of birds, turtles and crocodiles etc.
5. Researches on fish and wildlife, stressing fish and gamebird diseases and nutrition, and on migratory waterfowl problems should be encouraged.
6. Adequate provision for specific control over trade and taxidermy in wildlife and products derived therefrom should not be omitted in future legislations.
7. In order to prevent dealers from undertaking illegal trade by keeping animals, animal articles and trophies not in a shop but on private premises and carrying out trade therefrom, it may be necessary to provide for the mandatory declaration of animals and animal articles and trophies belonging to certain protected species, at the time the Act come into force. Further transfer of such possessions would require approval by the proper authorities.
8. The most operative and important provision of a national wildlife legislation is the one prescribing penalties. With forests and other habitats in rapid retreat, and wildlife populations drastically reduced and some even facing extinction, the penalties that wildlife legislation must provide for the violation of its provisions must necessarily be stringent. It is sad to note that this is not usually the case, most of the laws providing for fines and/or optional imprisonment of short durations.
9. The mandatory forfeiture to the government of any wildlife illegally hunted and products derived therefrom, together with any weapons and vehicles that may have been used for the commision of the crime, is also essential.
10. It would also be salutory to provide for the payment of rewards for services rendered in connection with the detection and prosecution of offenses under the law.

Better still, it would do well to follow a recent announcement of the government of Kenya. It announced the immediate ban on all game hunting, a move that has been applauded by conservationists around the world. Hunting licenses will no longer be issued, importation of weapons for such purposes is strictly forbidden and all hunting safaris are to be converted to photographic expeditions. The reason for the legislation is not new. Serious depletion of wildlife in Kenya's game reserves has been attributed to drought (causing an estimated death toll of two–thirds of the wildlife over the past five years), poaching activities, and hunters in search of big game trophies. It is hoped that by imposing the ban and cracking down on poachers, all species will be able to increase their numbers unhindered.

The author is an Environmental Lawyer and Consultant, National Environmental Protection Council of the Philippines.

Philippine eagle (Photo: Hum. Sett. Off. Dev. Acad. of the Philippines)

THE PROBOSCIS MONKEY, SOME PRELIMINARY OBSERVATIONS

by Sonia M. Jeffrey

During the period February to May 1978, proboscis monkeys *(Nasalis larvatus)* were observed on a section of the River Baai, East Kalimatan, some 25 km from the coast. The river is about 30 m wide, tidal and muddy, with no rapids and will take vessels with a 2½ m draught at Pengandan. Observations were limited to approximately 2 river km upstream (about 1 km direct) of Pengandan and about the same downstream.

A total of 68 river sightings of proboscis troops were made between 0600 hours (dawn) and 0830 hours in the mornings and 1630 hours and 1830 hours (dusk) in the evenings. Proboscis have not been observed from the river during the day but as they show a marked preference for sleeping in trees overhanging water, they return to the riverside 1 to 2 hours before dusk. The importance of sleeping close to or above water is illustrated if the monkeys are disturbed after they have already taken up their sleeping positions, which can occur up to 3/4 of an hour before dusk. If disturbed while it is still light, they will move inland only a short distance, wait until the danger has passed and then return. If disturbed at twilight, they usually will make no attempt to move although their silhouettes are clearly visible against the sky. During the morning twilight they readily move off if the observor approaches too close.

The reasons for sleeping at the riverside are not fully understood. It is probably safer, as predators could only approach from the landward side (except for man). Kern (1964) reports that proboscis will leap into the water from a height of 16 m (53 feet) and have been captured at night by approaching them from land and forcing them to jump into the water where a semi–circle of men in boats were waiting. I have disturbed the monkeys in the same way at dusk and they retreated by passing over my head. It was observed that proboscis inhabiting high forest chose the tallest trees (about 30 m) in which to sleep. This height in itself would put the monkey at a considerable risk if it were to leap into the water below. Proboscis are also known to sleep in trees above cliffs, thus increasing their height above the river to as much as 80 m. Since proboscis spend 2 to 5 hours daily feeding on vegetation which is visible from the river, riverine species probably form a substantial part of their diet.

There is a sharp distinction between the vegetation upstream and downstream of Pengandan, providing an interesting comparison of proboscis habitats. Upstream the river runs through a limestone gorge and is bordered by high forest with the exception of 2 small farms. Downstream, farming has reduced the upper canopy to 10 or 20 m. Pedada trees (*Sonneratia* spp.) are common in some places and it is in these trees that proboscis usually sleep. There is no *Nipa* palm although these occur in the lower reaches; proboscis are therefore by no means confined to Nipa–mangrove habitats.

Approximate numbers of proboscis seen along the 2 km upstream section range between 80 and at least 100 individuals which may be split up into 7 or less troops. Downstream up to 50 monkeys were seen forming up to 3 troops; on 2 occasions out of 7 no proboscis were seen on this section. My observations confirm those of Kern (1964) that troops are loosely organised. I have seen troops in excess of 80 (Kern reports troops in excess of 50) upstream and very few more were seen along a stretch of river that usually contained 3 to 4 troops, indicating that troops had amalgamated. Home ranges upstream, where the density of proboscis was higher, were probably not more than ½ km^2 and definitely less than the ½ square mile found by Kern in Brunei.

Proboscis are not thought to travel far inland, as my own and local observations indicate that they are not seen far from rivers. One troop was encountered 40 m inland at 1000 hours and another group was seen 100 m from the river at 1600 hours. Proboscis were reported eating *Albizia* leaves in a plantation 100 m from the river Sepaku. Excursions into the forest starting from the river between 1000 and 1600 hours have proven the difficulty in detecting proboscis monkeys since they retire to the upper canopy and remain motionless for long periods of time when threatened by an observor. A sudden loud noise may locate them as this may induce the males to emit nasal rumbles. My observations of troop structure agree with those of Kawabe and Mano (1972) in that large troops are multi–male; 2 adult males have been observed sleeping in the same small tree.

Disturbance of proboscis habitat

Man has undoubtedly caused a reduction in the proboscis habitat downstream. Upstream there has

Proboscis monkey (Photo: Chai)

been little change in the riverine vegetation, apart from 6 years ago when the occasional riverside tree was felled for timber. The numerous cliffs, ravines, swallow–holes and caves make the terrain uneconomical to log and travel on foot is very difficult. A small amount of forest produce has been collected, mainly rattan and building materials. The noise of machinery at Pengandan can be heard from both up and downstream, but this has been continuous since the timber operation started 6 years ago and is not considered to be of importance. A significant disturbance is caused at certain times by fishermen in canoes who set fish traps and hooks and lines near the banks and drive the monkeys away. Boats with engines, of which there are a few upstream and many more downstream, do not cause any visible disturbance as long as they maintain speed past the monkeys. Proboscis will not react to an observor on the river at a distance of 50 to 70 m.

Religious beliefs and firearms restrictions discourage the hunting of monkeys in the area and no evidence of hunting proboscis has been obtained; however, small proboscis monkeys have been picked out of the river when swimming across.

Other primates

After the proboscis monkey, the second most common species seen were the long–tailed macaques *(Macaca fascicularis)*. They were usually seen independently, but have been encountered with proboscis eating and sleeping adjacent to them. Gibbons (*Hylobates* spp.) were also seen with proboscis on one occasion, but this is the only gibbon observation from the river, although they are commonly heard and encountered in the hinterland. Two species of langur were seen, the silvered leaf monkey *(Presbytis cristata)* and another unidentified species. Two orang utans (one with young) were seen upstream and a pig–tailed macaque *(Macaca nemestrina)* was seen downstream.

Conservation aspects

The proboscis monkey is endemic to Borneo (Kalimantan, Sarawak, Brunei and Sabah), and since Kalimantan accounts for more than two–thirds of the island, Indonesia has a major part in the responsibility of protecting this species. *Nasalis larvatus* has been reported from 4 of Kalimantan's 7 established reserves, including Bukit Raya which is some 200 km from the coast (UNDP/FAO 1977). The status and distribution of species within the reserves are not known. Very little has been written on its habitat requirements and it is not known whether existing reserves provide adequate protection. Proboscis are present in a wider range of riverine habitats than was originally thought but no detailed ecological study has been made.

Although population pressure is not a serious problem yet in Kalimantan, people tend to live on the coast and along rivers, especially those which are navigable to small craft. The cutting of coastal and estuarine mangrove for chipwood production is endangering one of the favourite proboscis habitats. Settlements are spreading up the navigable rivers, and this has been added to considerably in the last decade by a rapid increase in the number of logging companies, many of which have their base camp on a river and use it to raft logs down to the coast. It is unfortunate that the specialised proboscis monkey must compete with man for its habitat.

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14th INTERNATIONAL SEMINAR ON NATIONAL PARKS AND EQUIVALENT RESERVES – AUGUST 1979

The Seminar is designed for administrators, professional personnel and conservation leaders responsible for the establishment, development and management of park and wildlife conservation systems and associated tourist programs throughout the world.

Since 1965, this Seminar has been attended by 426 park executives and conservation leaders from 84 countries. As a model program, it in part provided the basis for Recommendation 34 of the Action Plan of the United Nations Conference on Human Environment, 1972. As a result of its "splendid record" it was strongly advocated in Recommendation 18, Second World Conference on National Parks, 1972. It is listed in the Development Training Guide, AID, U.S. Department of State.

Location

The purpose of this Seminar is to examine the policies, administration, planning and other aspects of management of national parks and equivalent reserves. Primary emphasis will focus on natural areas with secondary emphasis on cultural resources. Field operations and facilities will be studied during the travel portions of the course. Parks to be visited will show a variety of planning, management, administration and research situations. There will be a strong focus on human impact on park resources and methods to cope with the resultant problems. The participants are expected to enter fully into the Seminar discussions following each major subject presentation.

This is a technical and professional course. The participants are selected without regard to race, creed or nationality. They are considered students of The University of Michigan. Under the policies of The University of Michigan, the U.S. National Park Service, and Parks Canada, all participants share classroom, buses or other educational facilities and modes of transportation without discrimination. All have equal opportunity for participation in the Seminar and have full freedom of inquiry in matters related to the administration of national parks and equivalent reserves. Political matters unrelated to the technical and professional aspects of the Seminar are not considered. The participants are expected to comply with these policies.

Instructional Staff

The Seminar will be conducted throughout the entire period by a continuing staff of exceptionally well-qualified instructors provided by The University of Michigan, the U.S. National Park Service, and Parks Canada. The Seminar staff will be supplemented at specific sites by selected administrators and experts from cooperating agencies and universities.

General Information

Travel and Accommodations

Travel on the Seminar will be by charter and commercial aircraft and by charter bus for the shorter distances. Cost estimates are based on double room occupancy.

Budget Estimate

Seminar Fees: The Seminar is operated on an actual cost basis. The registration and tuition fees, Seminar materials, meals and lodging (based on double occupancy) and Seminar travel will be approximately $2,000.00 (U.S.)

Additional Expenses: Additional personal expenses according to individual preference. Personal travel costs to and from the Seminar according to individual requirement.

The Seminar is offered in the English language only. Participants with only limited ability to speak and read English are not encouraged to apply.

Early Application

Enrollment in the Seminar must be limited to thirty-five (35) participants. Early application will therefore be advantageous in the event the Seminar is over-subscribed. We recommend that you send your application prior to March 1, 1979. Applicants accepted for admission will be sent registration information and material. Interested persons should direct **air mail** inquiries and applications to:

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National Parks and Equivalent Reserves
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The University of Michigan
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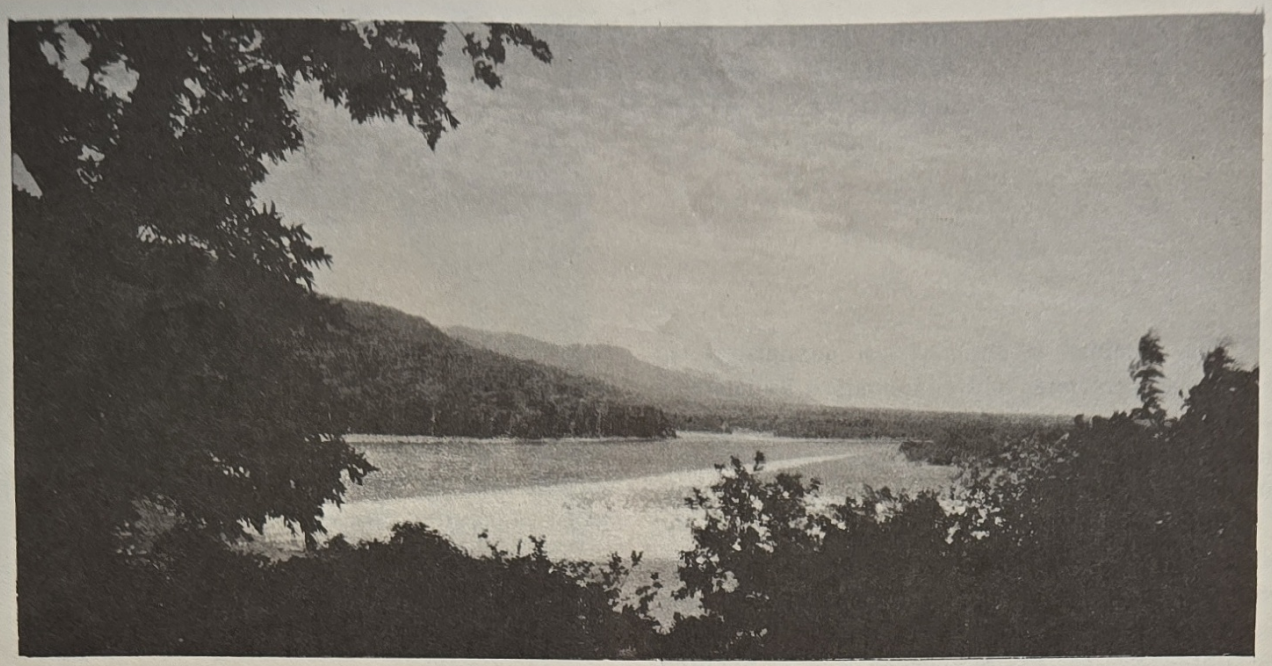


Manas Sanctuary near the Bhutan–India border. (Photo: Sakya)

PYGMY HOG CONSERVATION – A CHALLENGE

by Karna Sakya

(An article first prepared for **TIGERPAPER** *based upon the preliminary survey report of the Pygmy Hog Project.)*

Manas, the International Sanctuary of the Indian sub-continent in northwest Assam, is bounded within the territory of India and Bhutan. In the southern plains of the sanctuary I, along with Prem Chettri the forester, was looking for the smallest hog in the world, the rare, elusive Pygmy Hog, *Sus salvanious*. This animal, which had disappeared for more than a century, dramatically reappeared in the beginning of the nineteen-seventies. I never hoped to see this little beast, but Prem said he would show one to me. We thrashed around in every inch of the narrow trail, as well as in the open patches within the grass, and back along the trail which our elephant had made. From afar and atop, the growth of grass grew in clusters like a bamboo forest. In between these clusters most of the patches were covered with different kinds of herbs, ferns, and creepers, indicating the moist condition usually associated with Pygmy Hog habitat. We were told by our elephant mahout that the root and bulbs of the creeping plants *Saxifrage* family, locally known as "Matikaya" were reportedly the favourite food of the Pygmy Hog. Suddenly I caught a glimpse of two tiny, dark-brown Pygmy Hogs trotting swiftly, one after the other, in the faint trail of our elephant.

We madly searched for them but animals were too swift and had disappeared into the dense undergrowth.

The Pygmy Hog was first recorded and described by G.H. Hudgson in 1847. He stated that it had entirely escaped notice due to its being exclusively confined to the deep recesses of the primeval forest. In the past, very few hunters and naturalists had observed and studied this animal and it has still not been studied in the wild to any great extent.

During the nineteen-sixties the scarcity of recorded sightings led some authorities to believe that it was extinct. The **Red-Data Book** of I.U.C.N. has placed it in a gray sheet category as "insufficient information available". It was only in March, 1971 that it was rediscovered in Manas when a member of the Fauna Preservation Society photographed it (Oryx 1971). Subsequent studies of this animal were undertaken by Yandell (1971), Ranjitsinh (1972), Mallinson (1971, 1977) and Oliver (1977). But still more scientific research must be carried out in order to know this animal better.

Distribution and Habitat

Historically, the geographic distribution of the Pygmy Hog probably extended to all the outer foothills of the Himalayas – from the west of Assam to Uttar Pradesh. Now the distribution is restricted to a few minor spots north of the Brahmaputra Valley. A proper survey of its occurrence has not yet been carried out to date. Some authorities think that it exists in quite a few forest reserves in north Assam, but this is open to debate as many local authorities believe that the Pygmy Hog is now restricted to only two places in Assam, i.e. Manas and Bernadi.

The general habitat of the Pygmy Hog lies immediately below the Churia Range which forms the southern outer foothills of the Himalayas. This belt is known as the Bhabar Zone, between 100–500 feet above sea level. It has winding streams and rivers emerging from beneath the porous southern flank of the hills which drain into the moist, sandy loam, covered with grass and riverian forest. According to Champion and Seth, this type falls under the category of "Low Alleuvial Savannah Woodland". A gentle slope, covered by luxuriant vegetation, is formed from the alleuvial gravel washed down from the hills and accumulated at the base. The ideal habitat is not water –logged and is moderately covered by the biotic–climax grassland with a low density cover of riverian species such as *Bombax, Acacia* and *Dalbergia*. The grass consists mainly of several species of *Saccharum* and other coarse grasses like *Pragmatis,* which stands densely up to 16 feet. Sometimes the habitat extends into low density grassland mixed with an undergrowth of herbs like *Lea robusta* and *Lantana,* but never into an open environment. The animal's movements have also been noticed in the dry nala streams where the silt is just moist enough to harbour many biological activities like earthworms, snails and tadpoles. Under certain stress conditions Pygmy Hogs have also been found in open white ant nests.

In Manas, the population is mostly centralised in the southeast portion of the sanctuary. There are approximately 40 sq. km. of thatch land in the sanctuary area (Oliver, 1977). The habitat here is well preserved.

The Bernadi Reserve Forest is very small, approximately 24.6 sq. km., out of which only 50% of the total area is grassland (Oliver, 1977). This is the best known area for the Pygmy Hog – and from where many animals have been trapped. The habitat quality in the Reserve Forest is declining rapidly due to the lack of protection and tremendous pressure by the villagers.

Pygmy Hog in Nepal – A Question

There is a big question about the Pygmy Hog distribution in Nepal. The Hermal Institute Expedition from America spent four unsuccessful weeks searching for it. Since then no one has seriously looked for it. The I.U.C.N. has suggested that there may be some possible survivors in eastern Nepal. It is not clear why the speculation of occurrence has been pinpointed in the east of Nepal, whereas there are areas with a similar ecology in central as well as western Nepal. Moreover, this animal was once considered to be an indigenous species of the whole Himalayan foothills.

In early June of 1978, after studying live specimens in the zoo as well as in different enclosures and in its habitat in Bernadi and Manas, I visited a number of forest areas in the Morang and Sunsari districts of eastern Nepal. A comprehensive description of the animal was widely distributed in the villages and forest offices so that they might not be mistaken for an ordinary baby wild boar or a jungle rat. The responses were varied. There is not yet a definite record available that could prove the existence of this animal in Nepal. However, I heard that some of the piglets which the villagers captured – to be raised as livestock – never grew beyond a certain height. Most of the Nepalese are not aware of this kind of beast, and there is no local name for it.

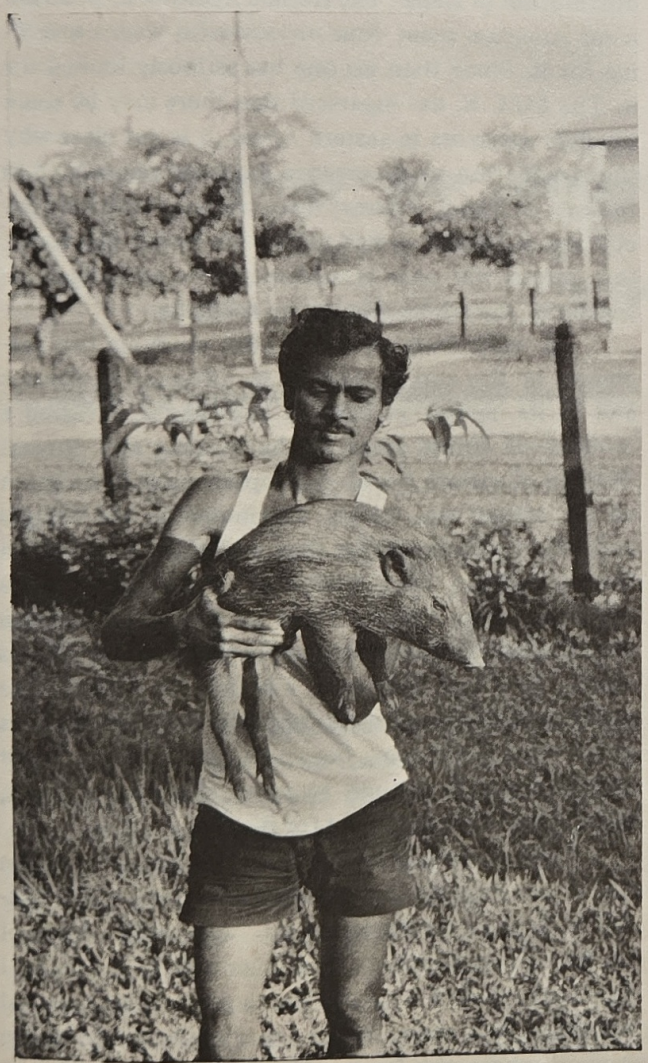
The topographical characteristics of eastern Nepal are very similar to Assam, but there is less rainfall in Nepal. And if there is any factor which does not favour the existence of the Pygmy Hog in Nepal, I personally feel it must be the degree of wetness and humidity that characterises the climatic conditions in Assam, where the Pygmy Hog exists, in contrast to the drier conditions found in Nepal.

I surveyed most of the forest areas of Morang and a few in the Sunsary district. Almost all the grassland forest of the Morang district has been completely transformed into agricultural land. The remaining forests like Dhulabari, Sukna forest of the south Morang district, have completely lost their grassland ecology. There is a minimal chance of finding the Pygmy Hog in the remaining forest.

Sunsary district has to be thoroughly investigated. Some forests like Ram Dhuni and the eastern section of Sunder Kunder were visited, but the habitat was entirely unsuitable.

The Koshi Tappu Wildlife Reserve on the other hand, could be an ideal habitat for the Pygmy Hog, but the past disastrous floods in that area would probably have eliminated the whole population had they existed there at that time.

There was a report of a sighting, supposedly a Pygmy Hog, around May of 1977 in Salakpu forest, east of the Koshi Tappu region. When I visited this spot, it did not look at all like the usual habitat for the Pygmy Hog. To confirm the presence of this animal it still remains for the forests like western Sunder Kunder, Trizuga forest, etc. to be surveyed.



An adult tamed Pygmy Hog. (Photo: Sakya)

But although these stories and rumours are insufficient to come to any solid conclusion about its present status in Nepal, they definitely furnish the base-line information.

Biology of the Pygmy Hog

This tiny hog stands only 10–12 inches high at the shoulder, and at 25 days old the baby is only 2½ inches tall. Its symmetrical body is covered thinly but uniformly by long, stiff hairs which are slightly longer at the nape. A small tail and hairless ears are the most striking characteristics.

Blackish-brown in colour, this hog has a reddish-white chest and abdomen, the skin of which is comparatively softer than the stiff dorsal body skin. A full-grown male has a distinct pair of razor-sharp tusks or canines (Oliver, 1977). The canines in the sub-adult male do not protrude as they are covered by the upper lip.

A distinctive peculiarity of this animal is its three pairs of teats, half the number possessed by other pigs (Yandell, 1971); (Mallinson, 1977). Actually, the number of teats is not a governing criteria for the separation of this species from the common boar of the wild Indian type. In Jhapa eastern Nepal, I saw a fifteen day old, 5 inch tall wild Indian boar piglet with only three pairs of teats. The number of pairs of teats in the common Indian wild boar is directly proportionate to its size (Rana, 1977).

The Pygmy Hog is remarkably strong and fast. When it gets excited and angry, it cries exactly like a domesticated pig with long tortured howling. Its body hardly moves even while it is trotting very fast. It has poor eyesight but its sense of hearing is very acute, the height of alertness being revealed by the sudden pause in its movements.

The adult male usually mates in the breeding season, which occurs twice a year (Hudgson, 1847). A litter usually comprises three to four piglets. The mating generally occurs in January and February and the gestation period is 110–120 days (Mallinson, 1977). Parturition takes place in April and May (Gauhati Zoo, 1978).

In captivity, mortality rates are tremendously high and the infant survival rate is low. The sex ratio of the litters favours the female. In the wild, of course, it is difficult to assess the sex ratio. The litters at birth cannot indicate the ratio in the adult population since a lot can happen while the piglets are growing. They live in groups of four to six.

A diurnal animal, it is very active in the morning and evening. Omnivorous in its feeding behaviour, it takes in a lot of earth while eating roots and bulbs of

grass and herbs. It generally avoids water, but has been seen paddling in muddy water under confined conditions.

Conservation – Past and Present

Since the rediscovery of the Pygmy Hog in 1971, the record clearly shows that not many efforts have been made to conserve its habitat. However, quite a few people were eager to possess it in the name of research. In fact, its dramatic reappearance created a kind of professional race among wildlife enthusiasts who may have wanted to be one of the official rediscoverers of this supposedly lost animal. A reward of more than three hundred rupees for capturing a live specimen encouraged local shikaris and villagers to enter the trapping business. Although the official record shows only 50 heads captured, there were more than 100 casualties. Those which escaped the net were shot with arrows and some, when caught, died from shock. The local authorities believe that more than 75% of the total population were trapped or killed purposely and also accidentally by the villagers during that crazy period. In such a low density area it amounted to a massacre. Now in Bernadi the occurrence of the Pygmy Hog is one per 4.5 hectre of land which means approximately 35–40 remnants in the whole area (Oliver, 1977).

In Manas, I estimated the approximate population to be 75–100. This is based upon a number of factors: local sources of information, discussion with the Director of Project Tiger – Manas Sanctuary, and my personal sampling of sighted ploughings of the remnants. It was fortunate that before the entire population was lost, the Pygmy Hog was afforded total protection in India by the Wildlife Protection Act 1972, which halted personal possession, poaching and hunting of the animal. It was indeed a start, but a lot remains to be done to ensure a viable population in the future.

The present declining population of the Pygmy Hog in Assam augurs poorly for the survival of this animal. Bernadi, one of the two pockets where this dwindling animal still exists and where many of them were captured, is still completely neglected. The ideal habitat was ravaged in 1964 by a large scale forest plantation, with follow–up operations such as controlled burning, weeding, etc. It is surprising that after such ecological catastrophes – combined with yearly forest fires, rampant grass cutting and unhygienic grazing – this persistent animal is still roaming around in the thin scrubs, fighting for its survival. If this area is not properly protected, it is inevitable in my opinion that "this animal is living here for dying".

Bernadi was proposed as a Pygmy Hog sanctuary by Ranjitsinh in 1972, but at that time the Assam Forest Department had already invested much money in the afforestation project there. It should be investigated whether this tiny chunk of forest could be put to better use as a sanctuary for the Pygmy Hog, since it is already known that with proper management this area would be an ideal habitat for the species. This would be preferable to creating a new sanctuary in an area foreign to this animal.

The protection of Bernadi is most urgent; the forest fires should be completely checked to bring back the original soil structure for retaining moisture, grass cutting should be completely abandoned for at least 4 years to provide enough coverage and no grazing or human interference should be allowed. At any cost, no animals should be trapped, captured or transferred anywhere unless and until their future is secured. If captive breeding or a genipool has to be set up, it should be done within the reserve. These ideas may look very conservative, but seven years of history in Bernadi says the risk of removing this species cannot be tolerated. The wisest step to begin with is to save its home range.

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In this sweeping view—with Prem Kumar, a park game scout shown resting on the trail—one can see Sagarmatha (Everest) at the extreme left, Lhotse, and Ama Dablam. Photo: D.L. Golobitsh

NEPAL'S PARK FOR THE HIGHEST MOUNTAIN

by P.H.C. Lucas

The highest mountain in the world is Nepal's incomparable Sagarmatha, "Mother of the Universe," an overpowering presence in a region of major natural and cultural significance.

Since it was first seen by western eyes in 1852, and no doubt for centuries before that, Sagarmatha, or Mount Everest as it is also known, has been accorded a special status. Gautama Buddha himself was born almost in its shadow, and over the years the great peak has inspired and fascinated millions.

It has also been an unconquered challenge to many a keen mountaineer, rebuffing all attempts until its massive 29,028 feet (8848 m) succumbed to Sir Edmund Hilary and Sherpa Tensing on May 29, 1953. But, in the words of Author Tukehida Kazami, 'you do not have to climb a mountain in Nepal to experience the beauty of the country. There is something indescribably delightful in just wandering around the countryside, the great mountains towering above you.' Ranging from the sub-tropical forests of the Terai to the great peaks of the Himalayas in the north, Nepal, with a land area of only 54,300 square miles (140,637 km^2) and a population of 11.5 million can boast some of the most spectacular natural areas in Southern Asia, with a variety of flora and fauna almost unparalleled elsewhere in the region.

Throughout the world, national parks have served for over a century to preserve and protect for the benefit and enjoyment of mankind examples of the world's most outstanding natural areas and wildlife. Many of these areas are, of course, major attractions to both local and international tourism. The concept of national parks has been adopted with enthusiasm by His Majesty, King Birendra Bir Bikram Shah Deva of Nepal, while their establishment as a conservation policy and as a means of stimulating tourism, an industry of growing economic importance to Nepal, was facilitated by the passing of Nepal's

'National Parks and Wildlife Conservation Act, 2029'.

First National Park

Several years ago the FAO and UNDP in co-operation with the Government of Nepal set up the National Parks and Wildlife Conservation Office (NPWCO) in the country's capital of Kathmandu. This Office was responsible for drafting the legislation and also the identification of several park projects.

Royal Chitawan National Park in the lowlands of the Terai, essentially a park established to conserve indigenous wildlife—including the dwindling populations of tiger and rhinoceros—was the first park officially constituted in Nepal. Development commenced about 1973.

Proposals in the NPWCO for a national park and other conservation measures in the Khumbu region, including Mount Everest, had been developing for some time. Arguments advanced in justifying the establishment of a national park in this area were (Blower 1972):

"1. As the highest point of Earth's surface, Mt. Everest and its surroundings are of major significance not only to Nepal but to the whole world, and its status as a National Park would bring international prestige and support to the country.

"2. Khumbu is already an important tourist area and its importance does not show any signs of decline. The scenic and wilderness values which are its major attractions must be protected from further exploitation and ill-judged commercial development. This can only be safeguarded through positive management based on sound conservation principles.

"3. The depleting forests of Khumbu are not only of aesthetic value but are vital for the people of Khumbu as a source of fuel and building material. They also play an important role in conservation of soil and water, and harbour much of the wildlife.

"4. As an ecological unit in the highest region of the world, the Dudh Kosi drainage is of much scientific value and offers unique research fields to scientists throughout the world.

"5. The area is of major religious and cultural significance in Nepal since it abounds in holy places like the Thyangboche monastery and also is the homeland of the Sherpas whose way of life is unique compared to other high altitude dwellers."

The region of the park

The Khumbu lies in the lap of the Himalayas. It is situated in the North Eastern region of Nepal in the Solu-Khumbu District of the Sagarmatha Zone.

Essentially, the Khumbu encompasses the upper catchment of the Dudh Kosi river system and is bounded on the north by the international border with the Tibetan region of the People's Republic of China. The Dudh Kosi catchment, which is roughly fan-shaped, is enclosed to the north by the massifs of Everest and Cho Oyu with their subsidiary peaks and glaciers and to the east and west by lesser ranges rising to 6,000 or 7,000 m and extending roughly at right angles to the main divide. It thus forms a distinct geographical unit enclosed on all sides by high mountain ranges. The Park covers an area of approximately 1243 km^2 (500 sq. miles).

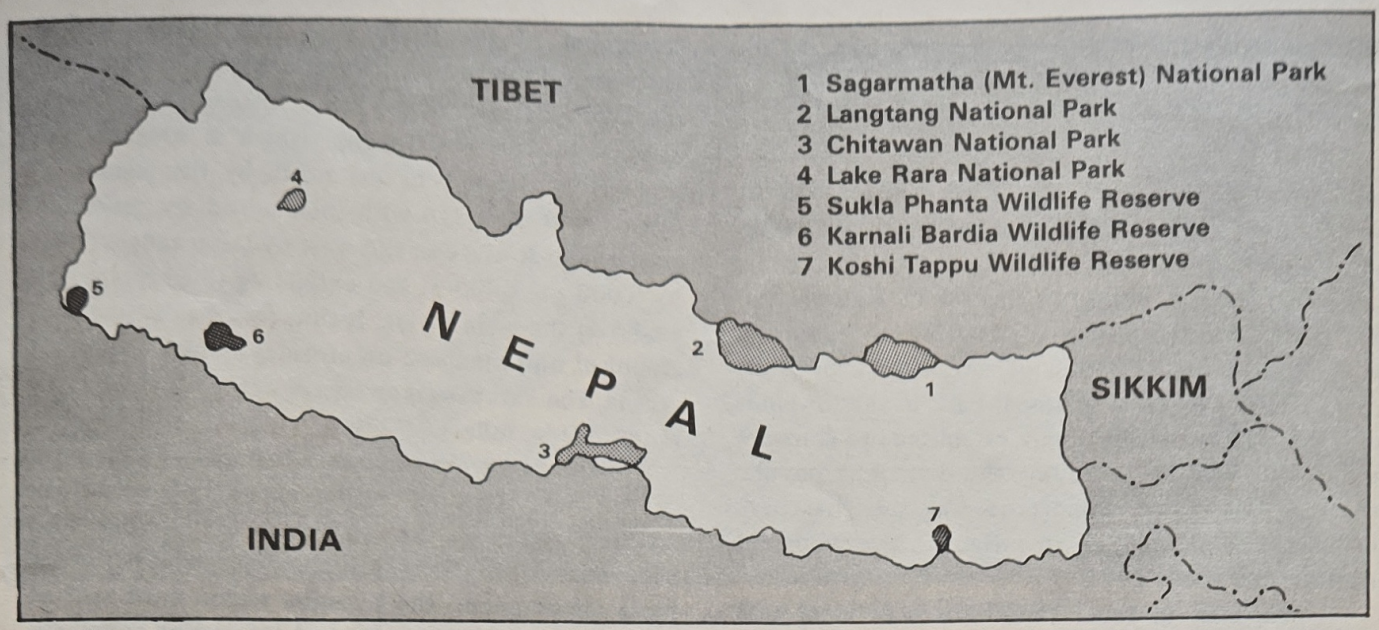
Broken by deep and rocky gorges with majestic peaks rising, often in isolation, above the surrounding country, and with the fascination of a people who have established a way of life in a beautiful but often harsh environment, the Khumbu region must rank as one of the most attractive and interesting anywhere to visit, especially as its complete absence of roads is in marked contrast with more developed areas of the world.

Apart from the scenic values of the area, the Khumbu supports vegetation and animal life which add to the justification for establishing a national park. The blue pine *(Pinus excelsa)*, fir *(Abies spectabilis)* and fir-juniper *(Juniperus recurva)* forests between 2,800 m and 3,900 m give way to birch-rhododendron woods *(Betula utilis, Rhododendron campanulatum and R. campylocarpum)* which are found mostly between 3,600 m and 4,200 m. Between 4,000 m and 4,700 m the dominant vegetation is juniper-rhododendron scrub *(Juniperus wallichiana, Rhododendron anthopogon and R. lepidotum)*. The highest limit reached by a rhododendron *(Rhododendron nivale)* is about 5,200 m. Above this, small scrubby plant communities are found to an altitude of about 6,000 m.

The mammal population of the Khumbu is very low and this is attributed directly to the activities of man in changing the forest habitat. However, wild mammals known to be present are the snow leopard, black bear, red panda, wolf, weasels and martens, Himalayan mouse hare, Himalayan tahr, blue sheep, goral, serow, musk deer and langur.

In contrast, the Khumbu is relatively rich in bird life including the blood pheasant, ruddy sheldrake, white-capped redstart, Himalayan dipper, Himalayan ruby-throat, snow pigeon, tufted pochard, jungle crow, red and yellow-billed choughs, and lammergeier.

Nepal envisaged potential economic benefits in establishing Sagarmatha (Mt. Everest) National Park and there is no doubt that this status rightly identified the region as one of the great scenic areas of the world and further enhanced its attraction as a tourist destination. The decision, in principle, in 1973 to establish the park was announced by the King's brother, His



Royal Highness Prince Gyanendra, at the World Congress of the World Wildlife Fund in Bonn in October 1973. The Park was officially gazetted in July 1976.

Bilateral aid

Over recent years there has been growing interest among other countries in the national parks and reserves system developed in New Zealand, as well as in the country's potential to provide experts to assist in park projects, including training of park personnel. This is in line with the New Zealand Government's external aid policy.

New Zealand's experience in mountain land management and His Majesty's Government's past favorable experience with New Zealand aid no doubt were among the factors which led to an approach to the Government of New Zealand for bilateral aid to establish Sagarmatha National Park. The New Zealand Government responded initially by sending to Nepal in May 1974 a three-man appraisal mission led by the author, then Director of National Parks and Reserves for New Zealand and a member of IUCN's International Commission on National Parks. N. D. Hardie, a leading mountaineer with considerable Himalayan experience and a member of the Arthur's Pass National Park Board and R. A. C. Hodder, Environment Forester with the New Zealand Forest Service, were the other members of the New Zealand Mission. They were assisted greatly by Hemanta R. Mishra of Nepal and Melvin Boulton of the NPWCO. Together they inspected all the major areas proposed for inclusion in the park and available to the public, covering some 193 km on foot and visiting Thame, Gokyo, the Everest Base Camp (approx 5400 m) and Chukhung. The outcome was a series of recommendations to the two Governments, one of which related to the sending of a New Zealand expert to serve as project manager to help plan Sagarmatha National Park and associated conservation programmes inside and outside the park and also to supervise the establishment of prototype facilities in an attempt to solve the developing conservation problems.

Environmental deterioration

The aesthetic and scientific reasons for using the national park concept to protect scenery and natural plant and animal life hold good in the Khumbu. But perhaps the greatest justification for the park was the vital social and economic need to call a halt to the environmental deterioration that was occurring.

Tourism is a major industry and an important foreign exchange earner for Nepal as well as one of the main sources of Sherpa income. Since a policy of facilitating tourism was adopted by His Majesty's Government, the number of foreign tourists visiting the Khumbu has increased from 20 in 1964 to about 4000 a year at present. Although relatively small, this number is significant because the park is a 12-day walk from a road.

Traditionally the Sherpa people (population about 3000), who live along the valley of the Dudh Kosi and its tributaries in the Khumbu have practised forest conservation but this unfortunately has lapsed in the face of growing pressures from an increased flow of immigrants and refugees with their yaks and sheep, and an increased demand for structural timber and

fuel-wood because of tourism, trekking and mountaineering expeditions. The result has been overgrazing of pine scrub and the forest floor as well as of grassland and also serious inroads into the limited timber resources in an area of high altitude and low productivity.

Overgrazing has led to heavy depletion of the vegetation in many areas leaving a remnant cover less capable of holding the soil. Early stages of erosion are much in evidence, the result not only of overgrazing but also of forest depletion.

Increasing numbers of visitors of all kinds were certainly bringing economic benefit to the people of the Khumbu but their impact on the natural resources and the tourist routes, where there were virtually no sanitation and rubbish disposal facilities, was also sowing the seeds of environmental and economic disaster. However, the establishment of the Khumbu area of Nepal as a national park meeting international criteria, with environmental safeguards established in the park and the adjoining environmental buffer zone, is expected to save the area from further modification of the vegetation and the various pollution and erosion problems.

New Zealand project manager

Co-operation between New Zealand and His Majesty's Government of Nepal in the field of nature conservation and preservation was agreed to with an overall aid program of $ NZ 300,000 for a five year period being established. Gordon Nicholls, formerly Supervisor of National Parks with the New Zealand National Parks Authority, was appointed Project Manager and left New Zealand in May 1975 on a two-year assignment to work with the Nepalese Government on the establishment of the park.

One of Gordon Nicholls' early involvements was to commence building a park centre on a knoll above Namche Bazaar, the last 'big' town before Everest Base Camp. Construction is in the natural stone of the region and the site has commanding views of the valley below the Khumbu region, Everest and other peaks. Bruce Jefferies has succeeded Gordon Nicholls, and with his Nepali counterpart is concentrating on establishing an effective park administration.

For visitors to the park, an accommodation and camping complex has been built. Located at Thyangboche, the complex comprises an accommodation lodge, camping facilities, kitchen water supply, toilets and rubbish disposal amenities.

As the complex is in intimate contact with the park environment, landscaping will ensure that the visual impact blends pleasantly with the Himalayan background.

In many ways very encouraging support is being received from the Sherpa community. The tree replanting program is under way in and around the villages in the park buffer zone. Young trees planted during the last two years have survived well. The result of these conservation efforts will, it is hoped, go a long way towards ensuring that the approach to the park is as inviting as possible.

Significant progress has been made on the legislative and administrative aspects of the park's establishment. Boundary definitions have been decided while a draft management plan is being prepared and park regulations (by-laws) which will apply to all Nepalese mountain national parks have practically reached finality and will be published shortly.

Associated with New Zealand's park project efforts in Nepal itself is the training in New Zealand of young Sherpa men from the Khumbu. Training in both the practical and administrative aspects of park-management is given. These trainees on return will become the administrators and wardens of the park that preserves and protects the natural environment of the highest mountain in the world – to the Nepali, Sagarmatha, 'Mother of the Universe'.

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REHABILITATION, A NEW APPROACH IS NEEDED

by Herman and Ans Rijksen

Rehabilitation of orang utans *(Pongo pygmaeus)* which have been kept in captivity was first attempted by Mrs. Barbara Harrison in the early sixties. At that time the general opinion was that the orang utan population had declined to a dangerously low number, and that every rehabilitated individual would be a valuable asset in order to save the species from extinction. Her action was also intended to focus worldwide attention on the rapidly increasing threats which subdued this ape. Her project started in the Bako National Park in Sarawak, an area with tropical rain forest, from where the orang utan had vanished a long time ago. For political reasons the Bako station was abolished and the animals were transported to a new rehabilitation station in Sabah in the Kabili-Sepilok Forest Reserve, where wild orang utans still survived.

Through the initiation of the W.W.F. it was decided in 1970 to start a similar experiment in Northern Sumatra. A preliminary survey by F. Kurt in 1970 had revealed that, in spite of a law of 1932, which strictly prohibited the capture, keeping and trading of orang utans, a substantial number of apes were still being held in captivity there. A major problem in the combat against those illegal activities was that local authorities had no place to take any confiscated orang utan, and therefore they left these cases untouched. On a few occasions confiscated orang utans were delivered to local zoos. In general this was not much of a solution, since some of those zoos themselves were involved in the illegal trade and export of protected animals.

In 1971 with funds from the Netherlands National Appeal of the W.W.F. and the Netherlands Organization for Pure Scientific Research, a rehabilitation station was established in the Gunung Leuser Reserve, in North Sumatra. The "Ketambe Rehabilitation Station" was built in an area where wild órang utans were still present. This location was chosen because it was hoped that the rehabilitated individuals would be incorporated into the wild population.

Parallel to the rehabilitation project, a study was carried out on the wild orang utans in the Ketambe area. The main objective of the station was to accomodate confiscated apes, which had been illegally kept in captivity.

Although the law dictates that such confiscated animals had to be "returned to their freedom in the rainforest", it is obvious that orang utan babies abandoned in the forest would certainly die. Especially for young animals, as well as those which had been kept in captivity for a long time, good care is necessary to readjust them to the life in the forest.

The expectations were, that by strengthening the search for, and the confiscation activities, hunting and trade would decrease so much that the rehabilitation station would no longer be necessary after a number of years.

Shortly after the establishment of the Ketambe station, an orang utan rehabilitation centre was set up in Tanjung Puting (in Kalimantan). At that centre, research on the biology of wild orang utans would also be done. In 1973 the Frankfurter Zoologische Gesellschaft built a second orang utan rehabilitation centre in Northern Sumatra in the Langkat section of the Gunung Leuser Reserve. Plans exist to establish a rehabilitation centre in Sarawak also.

The experiences with rehabilitation centres made since 1971 require critical judgements as to their merits as far as their role in the protection of orang utans and tropical rainforests is concerned.

Why rehabilitation

In the text above, it has been made clear that rehabilitation provides a major contribution towards the restriction of the trade in apes, because it becomes possible to carry out the requirements as described in the law. Through a strict confiscation policy, captive orang utans are now really regarded as illegal property; hunters and traders face financial losses, even though they do not get prosecuted or fined (something which has not occurred so far). Rehabilitation has shown to

have a marked effect, which is perhaps best illustrated by the fact that illegal hunting and trade of orang utans, especially in the areas of the rehabilitation centres, has decreased to a great extent, and in some areas it has stopped completely.

Unfortunately, the capture and killing of orang utans has not been stamped out completely. One should realize that in the large areas where tropical rainforest is destroyed for commercial purposes or where there is a demand for agricultural land, orang utans are very likely to become victims of these human activities. In other words, as long as rainforests are exploited or destroyed, orang utans will get killed or captured. The expectation that the rehabilitation centres would no longer be necessary after a number of years can therefore very likely be regarded as Utopian. It will be necessary to keep these centres running to prevent a new increase in trade.

Another important result of rehabilitation is the attraction of attention throughout the world to the growing problems in nature conservation. Rehabilitation of apes is a project which carries a lot of publicity value. Apes are our very relatives in the animal kingdom and have a lot of appeal to mankind. Besides this, any project in which humans are actively participating in the protection of nature, receives much public sympathy. Rehabilitation centres are among the few places where visitors can watch orang utans in their natural habitat.

Those centres which can be reached fairly easily (like Sepilok and Bohorok) attract large numbers of visitors. The local residents and authorities therefore realize that rainforests can also, without exploitation, be a source of revenue.

Ketambe station and Tanjung Puting, which are less accessible have developed into research centres for more general studies of tropical rainforests and their conservation.

Through close cooperation between Indonesian and foreign research-workers, a lot of knowledge has been gathered at those places on the biology of the orang utan.

What is against rehabilitation?

Up until approximately 10 years ago, hunting and trade composed the main threat to the wild orang utan populations. At that time hardly any attention was paid to the possible negative aspects which rehabilitation could have on the wild population. The main purpose was to reintroduce individuals into the wild population.

Recent research on the existence and distribution of the orang utan, in particular in Sumatra, has revealed that the present population is probably large enough to keep the species going.

The number of wild Sumatran orang utans is estimated to be between 5,000 and 15,000 individuals. Viewed from this perspective, rehabilitation has only limited value, as a means to contribute towards the breeding stock of the wild population. The number of rehabilitated animals is relatively low; in the period 1971 – 1978, less than 100 orang utans were reintroduced into the wild at the Sumatran centres. (The number of animals which were received at these stations was much higher, but a sizeable number of them were lost through disease and predation.) The number of wild orang utans is not the limiting factor, but the *habitat* is. In the last 10 years the orang utan has found a much more dangerous threat than before: the destruction of its habitat, the tropical rainforest.

There are other arguments against rehabilitation. Reintroduction of orang utans, which were once held in captivity, into a healthy wild population, can lead to a serious disturbance of the social organization and of the ecological balance. This also includes the introduction of diseases.

All apes are vulnerable to human diseases. Before acceptance into the rehabilitation centres, orang utans have been in close contact with humans, who could

Orang utan (Photo: Chai)

have been carriers of diseases fatal to orang utans. The animals are vulnerable, mainly because their condition has often deteriorated through transport or in captivity.

The quarantine, and the medical examination which is carried out on the newly arrived animals, can not guarantee that all dangerous diseases (in the stage of latent infection) can be discounted. On top of that those animals can also, through contact with research workers, attendants or visitors, contract diseases. In other words, human diseases which can penetrate through rehabilitation centres are a threat to the wild orang utan population which should not be neglected.

New approach

From the above discussion it will be made clear that rehabilitation of an animal species should not automatically be regarded as the most laudable action which can be taken; in some cases it might even lead to the destruction of a population, instead of the proposed, and well-intended, action towards survival.

Current approaches to protect the orang utan are still based on conditions as they occurred 15 years ago. Once it is clear (and it *is* very clear) that it is not so much hunting and trade, but habitat destruction which threatens the wild orang utans, the main emphasis of orang utan protection has to be put on habitat protection. Measures to achieve this goal are of a different order altogether, and cannot be compared with the task of rehabilitation of individual ornag utans. These measures will include, among others, the prevention of commercial logging, the implementation of a population policy through birth control and the intensification of agriculture on existing croplands. No matter how difficult or impossible the solutions to these world problems might be, they should never be a reason for focusing all attention on the more spectacular nature protection projects like orang utan rehabilitation.

However, as long as the destruction of the rainforest continues there will be a need for accomodation of displaced animals. But if a rehabilitation project is to really contribute to the preservation of the orang utan, then the reintroductions should take place in areas where they cannot interact with wild orang utans. Viewed strictly from the wildlife conservation angle it is therefore no longer justifiable to continue support for those projects which cannot fulfill this stipulation.

Ans and Herman Rijksen worked at the Kotambe Rehabilitation Station in Northern Sumatra in the early seventies. This article was submitted, in Dutch, to **Panda Nieuus**, *the bulletin of the Dutch National Appeal of the World Wildlife Fund.*

THE BIRD TRADE

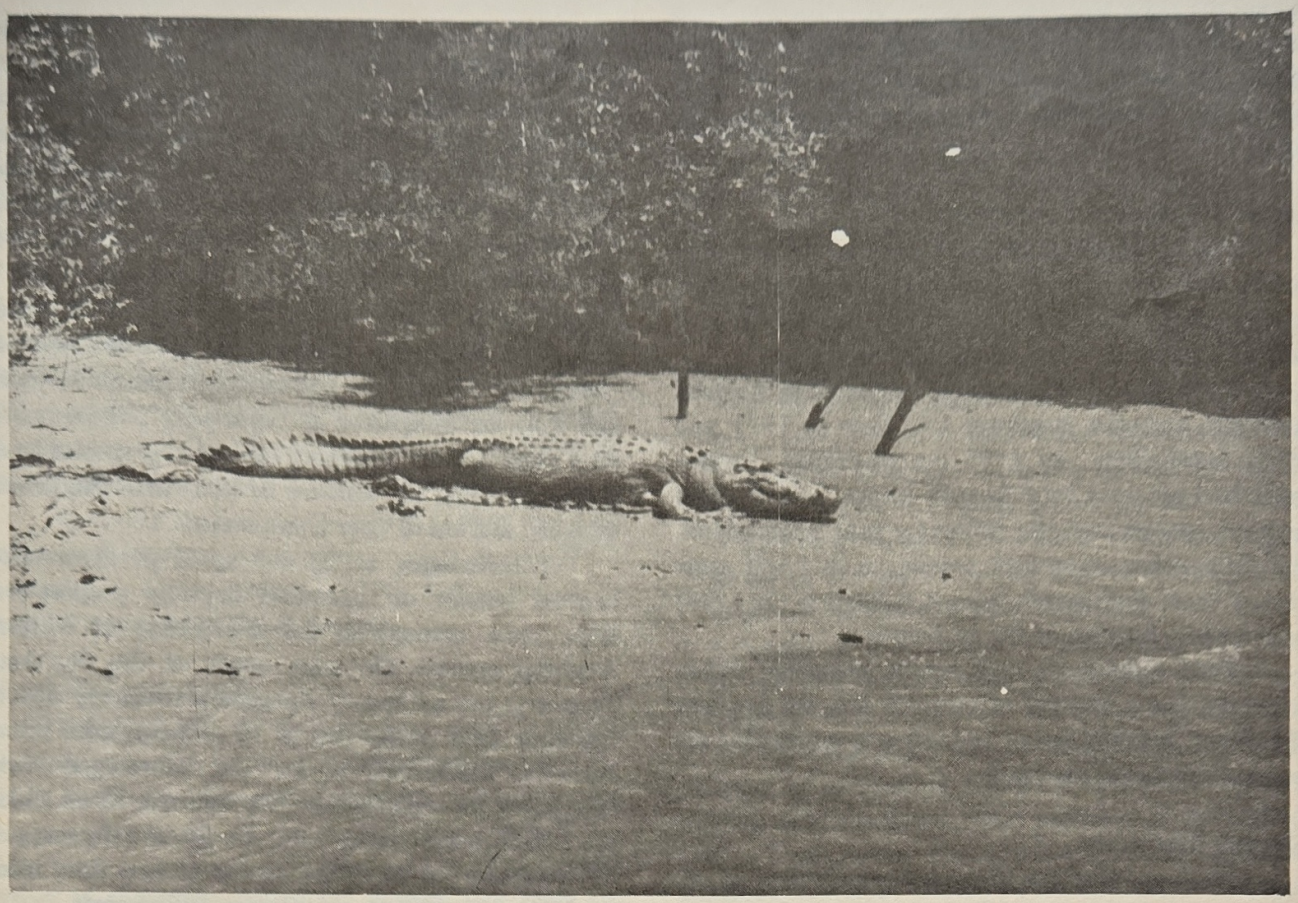
Concern has been recently expressed from a number of quarters, including IUCN, at the increasing traffic in birds, especially from Maluku and Irian Jaya. The export of live birds from these areas is confined mainly to members of the *Psittacidae*, especially cockatoos, lories and parrots, only some species of which are protected under present law. There are 75 species of *Psittacidae* in Indonesia of which 61 are endemic, yet of these only four are at present legally protected, and these are not among the rarest or most endangered. Many species are confined to quite small islands and are therefore extremely vulnerable to extinction.

Permits issued for export of cockatoos increased from 2,800 in 1971 to 8,800 in 1977, but these figures can only represent a fraction of the numbers actually exported. Apart from the large numbers exported legally (though frequently falsely designated as to species), many more are smuggled out or taken by individual travellers leaving Maluku or Irian Jaya by air, who are officially permitted to take up to four birds each of "unprotected" species.

As a result of this continuing exploitation these colourful birds so characteristic of the eastern islands are becoming increasingly rare, and urgent action is needed to control the trade if many species are not soon to become extinct.

Apart from live birds there is also a considerable traffic in birds of paradise skins from Irian Jaya, with as many as 2,000 a month reportedly being exported from Merauke alone. Skins fetch Rp 14,000 – 15,000 each in Merauke (equal to over a month's wages) and Rp 20,000 – 25,000 in Jakarta, where they are unfortunately still in demand as a form of status symbol.

from: **Conservation Indonesia**, *Vol 2. No. 5, December 1978.*



A 3.5 meter Crocodylus porosus basking on a mudbank, Blyth River, Northern Territory, Australia. (Photo: Wells)

CROCODILES IN AUSTRALIA

by Graeme Wells

Australia has two species of crocodile; *Crocodylus porosus,* the estuarine or salt–water crocodile, and an endemic freshwater species, *Crocodylus johnstoni.* They are easily distinguishable in the field – the snout of *C. johnstoni* being more slender than that of *C. porosus.*

The salt–water crocodile is one of the most widely distributed of all crocodilians, extending from India, through south east Asia to the north Australian coastline – the southern limit of its range. Such a wide distribution for the species has undoubtedly facilitated its survival to date. Severe overharvesting of the species, principally for the skin trade, throughout its range has drastically reduced the population. Within south and south east Asia, the species is now highly endangered (Whitaker and Daniel, 1978). Salt–water crocodiles have been known to exceed 7 metres in length, making them one of the largest living reptiles.

The freshwater crocodile, *C. johnstoni,* usually inhabits freshwater swamps and waterholes along freshwater portions of north Australian rivers. Recently, the species has been observed in brackish tidal waters. Appreciably smaller than the salt–water crocodile (maximum size around 3 metres), the species

has received little study. Extensive slaughter of the species for the skin trade did not commence until the mid–'60s, after methods were found of tanning its skin.

Legal Status and Protection

Due to uncontrolled shooting and baiting with hooks, numbers of both species of crocodiles started to decrease by the late 1960s. Many river systems in northern Australia were effectively "wiped out".

Both species were declared protected by Western Australia and the Northern Territory in 1971 and 1972, respectively. By 1973 the Australian Government had placed a total import–export ban on trade in both species and the following year, Queensland, the only other state with crocodiles that still sanctioned their destruction, passed legislation (in 1974) prohibiting shooting of the crocodilians.

Both species are now totally protected within Australia and a number of research programmes into the status and biology of the remnant population are currently being carried out.

Survey Methods

Methods used for surveying populations of salt–water crocodiles in tidal river systems have been described by Messel (1977) and Messel *et al* (1978). It should be noted that these methods do not necessarily apply to non–tidal river systems or freshwater swamp habitat.

Maps of rivers are first prepared from aerial photographs. During daytime familiarization surveys, reflective markers and tapes are placed every 5km along the banks of the rivers and creeks (corresponding to night–time surveying time intervals of 10 – 30 minutes). These markers minimize errors during navigation at night and break each river or creek system into readily identifiable sub–sections. Various environmental parameters such as air/water/substrate temperatures, high and low tide salinity readings, etc. are recorded at each marker position.

Night spotlight counts of crocodiles are conducted from two modified 5.5m workboats, each containing 3 or 4 researchers. Crocodiles can be located easily at night as the tapetum of their eyes reflects light and appears as a reddish or yellowish glow in the beam of a spotlight. Surveys are undertaken only around low tide when sufficient exposed mud bank separates the fringing riverside mangrove vegetation from the water's edge. This reduces the number of animals missed due to screening by vegetation.

The location of each crocodile observed is recorded. Whenever possible, the animal is approached to within 6 metres and its size is estimated by an experienced observer, who also notes its situation (whether on the bank, in mud, in shallow water, etc.) and pertinent behavioural observations. Calibration trials have shown experienced observers to be very accurate at estimating size. Crocodiles spotted are categorized by size classes as follows: hatchlings, 2–3' (60–90cm), 3–4' (90–120), 4–5' (1.2–1.5m), 5–6' (1.5–1.8m), 6–7' (1.8–2.1m) and longer than 7' (longer than 2.1m). When the size of a crocodile cannot be estimated, it is grouped into the category "eyes only". Where the two crocodile species co–exist and they are designated as "eyes only", these crocodiles must remain "unidentified" even at species level. A density using the number of non–hatchling crocodiles sighted/km of river is calculated.

Effectiveness, safety and speed of observation depend largely on adequate daytime preparation. Many river systems in the Kimberleys of Western Australia around the west coast of the Northern Territory, are extremely dangerous to survey due to the large tidal ranges (up to 10 metres), tidal bores, currents, whirlpools, rapids and submerged rocks that occur throughout the river courses. As an added precaution, such river systems are also aerially mapped by observers for obstacles visible at low tide, using the University of Sydney's Cessna 206 aircraft.

Nesting and Mortality of *C. porosus*

In northern Australia, salt–water crocodiles usually nest during the wet season. Nests are mounds normally constructed from plant matter and mud. Up to four wallows may occur around the mound. Mean number of eggs per nest is 50 and incubation time is between 80–98 days (Webb *et al*, 1977).

During the wet season, widespread flooding occurs on many of the northern rivers, inundating and destroying crocodile embryos in many riverside nests. This natural phenomenon, coupled with the extremely low number of adult salt–water crocodiles remaining in the wild and natural predation of eggs, means that survivorship from riverside nests is quite low.

Nests constructed in freshwater swamps have a higher rate of survival. In areas of the Finniss and Reynolds Rivers (west of Darwin, NT), many nests are constructed on floating mats of vegetation (Lindner, pers. comm.) and inundation of nests does not occur as the vegetation mats float up and down with changing water levels.

The number of hatchlings that eventually reach a river or creek system is quite low considering the number of eggs per nest. The young may remain with the mother crocodile as a hatchling group for a number of months (creche or pod formation), or alternatively they may spread out throughout an entire

river system.

Mortality of *C. porosus* hatchlings varies depending on many factors – of major importance appears to be the availability of food and water turbidity. Hatchlings that enter rivers in clear, freshwater upstream portions suffer much higher rates of predation than similar hatchlings residing in more turbid waters – commonly found in the mid–reaches of a tidal river system. Hatchling mortality in estuaries can also be quite high and based on mark/recapture studies in the Blyth/ Cadell river system estimates as high as 90% mortality for hatchling *C. porosus* were obtained in estuaries and the upstream freshwater portions of tidal rivers within only a three–month period.

Mortality rate of *C. porosus* hatchlings over an entire undisturbed tidal river system in northern Australia is of the order of 30% during the three months terminating the dry season.

Mark/Release Study

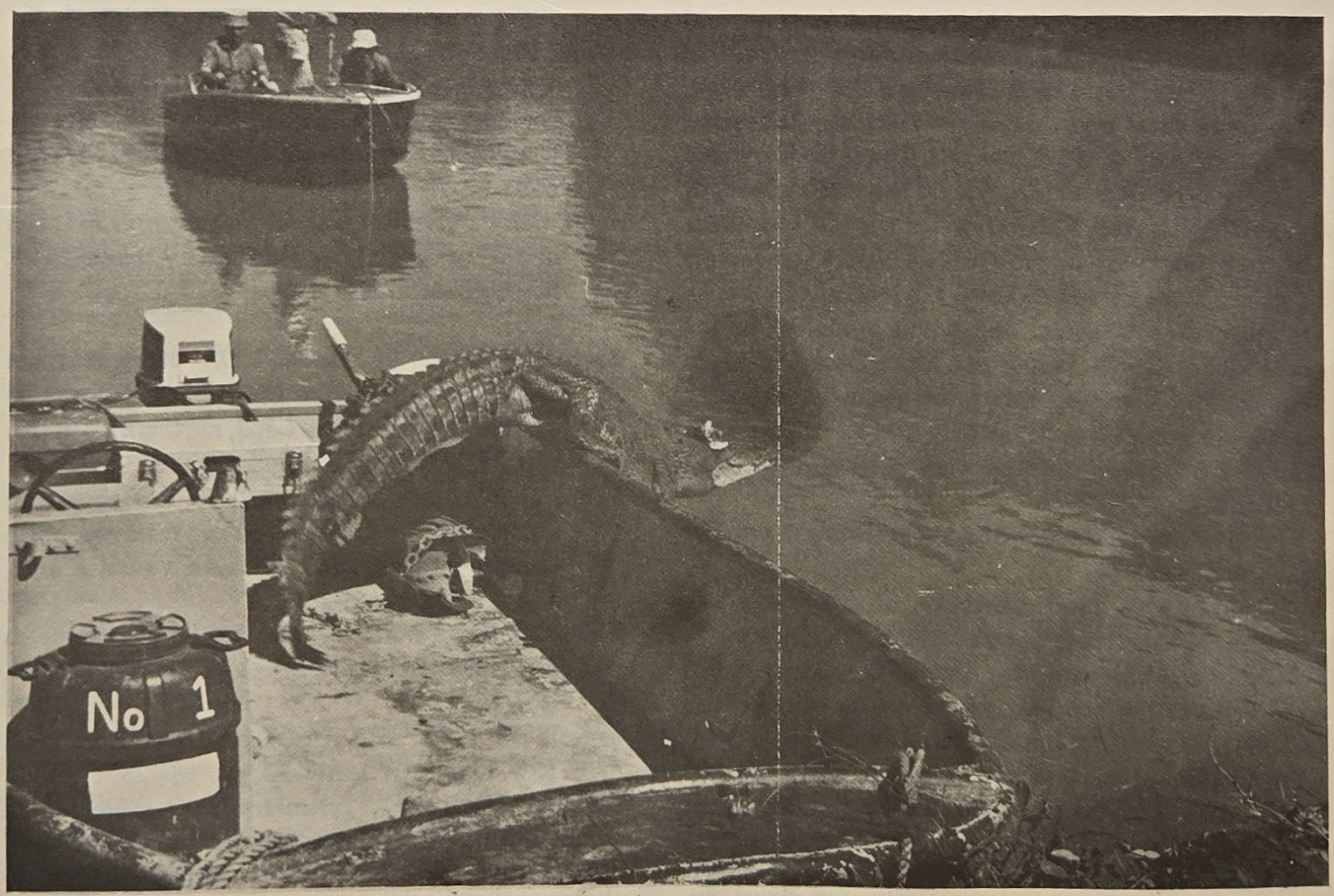
Nearly 2,000 *C. porosus* have been captured, marked and released in a major effort to solve the basic problems concerning growth, movement and dispersal patterns of the species. Some individuals have been recaptured four times and in 1979 a major effort to recapture crocodiles marked five years ago will get underway. The finalization of this study should provide a lot of the answers as to just what crocodiles do. Radio telemetric devices designed and manufactured within the programme have been used with some success to track larger–sized individuals continuously in the field. For a fuller discussion, the reader is referred to the various papers by Webb, Messel and Yerbury in the bibliography.

Habitat Considerations

Tidal river systems in northern Australia can be divided broadly into three types:

1. Systems having extensive catchment areas–systems that remain fresh in their upper tidal reaches, i.e. as distance upstream increases, salinity decreases.
2. Systems having extremely limited catchment areas – such systems have a tendency to become hypersaline by the end of the dry season, i.e. as distance upstream increases, salinity decreases.
3. Estuaries of river systems – areas that, over most of the year, exhibit salinities close to that of seawater.

In the literature, salt–water crocodiles are often thought of as residing primarily in brackish waters, making only occasional long journeys at sea (Allen, (1974) ; Brazaitus, (1973)) From surveys and the continual taking of salinity measurements, it has been determined that salt–water crocodiles can tolerate



Releasing a 2.8 meter female Crocodylus porosus from a workboat, Arnhem Land, Northern Territory, Australia. A solar powered radio tracking transmitter can be seen attached to the head. (Photo: Wells)

unknown periods in salinities up to 5.4%, which is about 1½ times the salinity of seawater. No *C. porosus* has ever been observed in salinities higher than 5.4%, and it would appear that this level of salt approaches the salinity tolerance for the species in the field.

Salt–water crocodiles occur most commonly in those tidal river systems that possess extensive catchment areas and these are the major breeding systems. Few *C. porosus* are observed in hypersaline rivers or creeks at the end of the dry season. Estuaries, harbours and embayments around the northern coasts commonly support larger sized *C. porosus* (longer than 2.1 metres). Few small *C. porosus* are observed in such localities.

The freshwater crocodile, *C. johnstoni*, generally has been considered only to occur in non–tidal freshwater habitats (Worrell, 1952; Cogger, 1975; Webb, 1977). This is not always the case and the Crocodile Research Projects' team has found *C. johnstoni* in brackish waters up to 1.3%. (Seawater 3.2%–3.5%). In certain nothern rivers *C. johnstoni* even reside with *C. porosus* (a more aggressive species) and many interesting behavioural studies can be contemplated. A new reappraisal of the life history of *C. johnstoni* may be warranted.

Number of Salt–water Crocodiles Sighted:

Salt–water crocodile surveys (1975–78) of sixty river systems across northern Australia (area covered includes the Kimberleys of Western Australia and most of the river systems in the Northern Territory) show, using the latest available survey result for each river, a total of only 4,353 *C. porosus*. The surveys covered 2,786 km of tidal waterways. Of the total number of individuals sighted, 22% were hatchlings (i.e. crocodiles in their first year of growth), 54% were sub–adults between 0.6–1.8 metres (2–6') in length, 14% were a mixture of sub–adults and adults while 9% of the crocodiles sighted could not be approached close enough for a size estimate to be given. Those individuals are grouped as "eyes only". Most of the "eyes only" crocodiles would be wary sub–adult or adult crocodiles.

The overall density of non–hatchling *C. porosus* per km of river was 1.21.

Even after total protection of salt–water crocodiles in Australia, recruitment of the species in many of the northern river systems is still quite small and reflects the extreme overharvesting for the skin trade that was previously permitted. Since 1974, populations of *C. porosus* have remained relatively static and even though considerable numbers of hatchlings were found at certain times of the year in various rivers, natural mortality of these hatchlings is quite high. Recruitment will most likely increase at a faster rate once juveniles in the present populations reach adulthood. This could take up to a decade.

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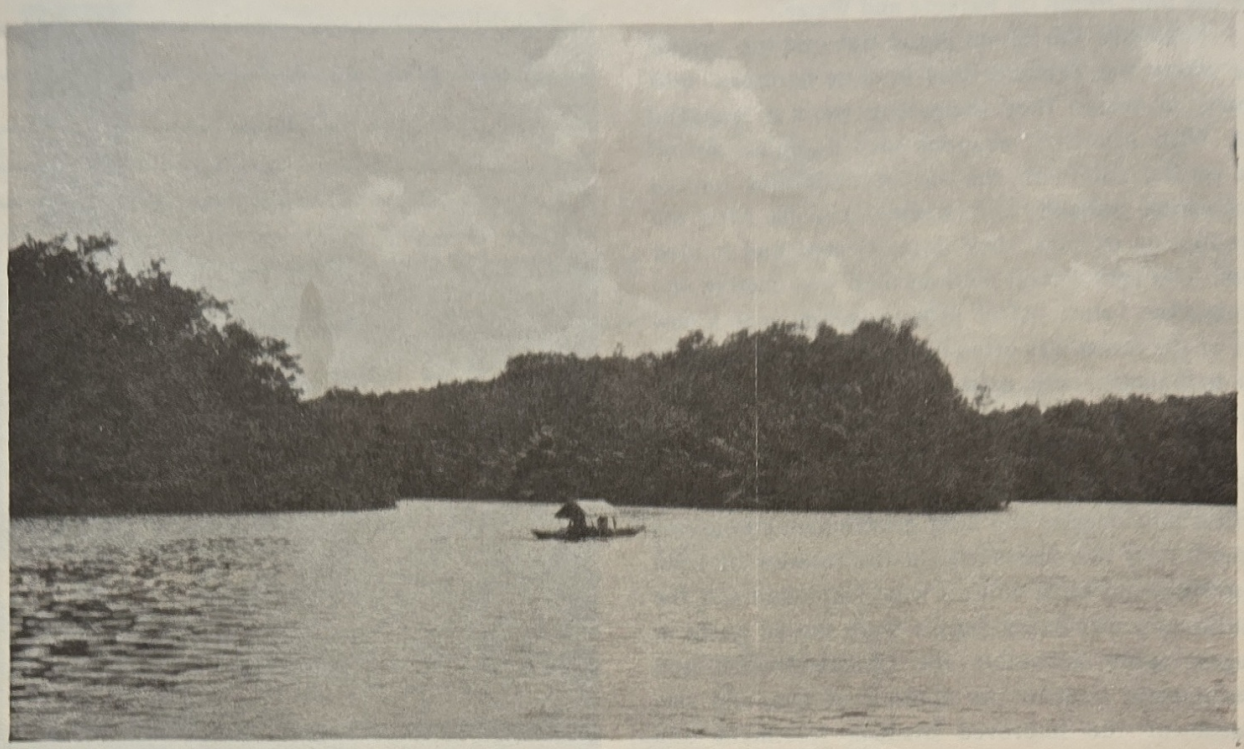


Mangroves of Mamberamo-delta (van der Zon)

DEVELOPMENT OF NATURE RESERVES IN IRIAN JAYA (INDONESIA)

by Yaya Mulyana and A.P.M. van der Zon

The origin of New Guinea is closely connected with the old supercontinent Gondwanaland which split into South America, Antarctica and Australia during the late Palaeozoic. The eastern part, Australia, moved northeastwards towards the large Pacific Block. As a result, in the Tertiary and Quarternary the Circum-Australian ridge rose up, upon which New Guinea is situated. The western part of the island of New Guinea forms Indonesia's largest province, Irian Jaya, with an area of 410,000 km^2.

The main topographical feature is the east-west running cordillera with permanently snow-covered peaks such as Mt. Mandala (4,700 m), Mt. Idenburg (4,680 m) and Mt. Jaya (=Carstenz top, 4,884 m), the highest mountain of Southeast Asia. To the south, the slopes are very steep but to the north they fall gradually via a series of lower ranges to the *'Meervlakte'*, a large inland swampy plain and onward to the coasts. Much of the Irian population, including the well-known Baliem tribes, live in the lower range, but still at an altitude of several thousands of metres.

Nearly the whole of Irian Jaya is still forested; only on some higher plains, and in the southeast near Merauke, are man-made and natural grasslands found. The lowland flora shows strong affinities to the Malesian flora but there is much endemism. The highland flora has a strong alliance with Australia (Paymans, 1976).

The mammalian fauna has many Australian elements with marsupials like cuscus (*Phalanger* spp.), tree kangaroo (*Dendrolagus* spp.) and wallaby *(Dorcopsis hageni).* During the last Glacial period some murids (rats and mice) reached New Guinea and these rodents underwent a strong speciation in the many unoccupied niches. This also happened with the bats.

Irian Jaya is famous for its birds; birds of paradise, crowned pigeons, cassowaries and many of the colourful parrots and cockatoos developed in New Guinea.

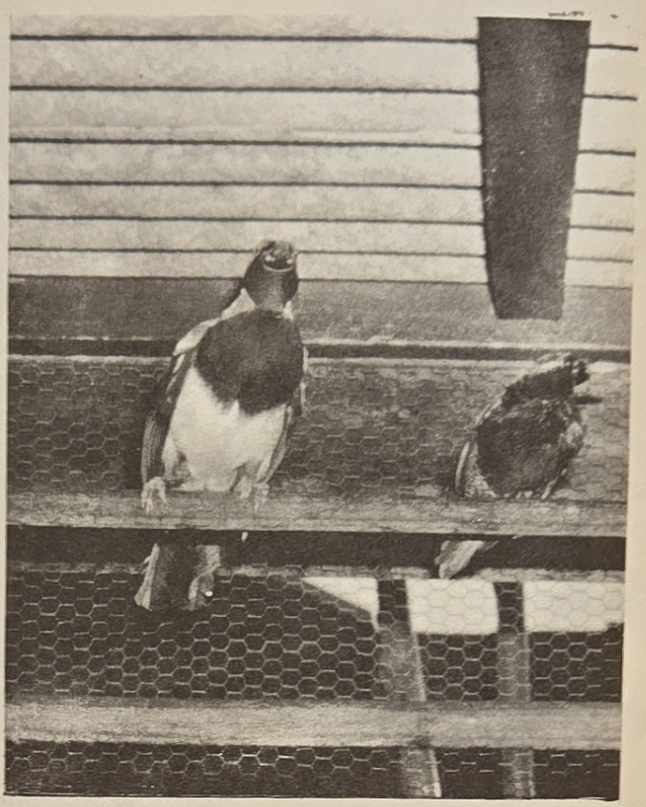
The Central Mountain Range forms the main geographical barrier between the northern and southern lowland fauna, in addition to the partial isolation of the Vogelkop due to the narrow isthmus. The many offshore islands show an impoverished flora and fauna but with several endemics like the *Paradisaea rubra* and *Diphyllodes respublica,* two birds of

paradise only found on Batanta and Waigeo.

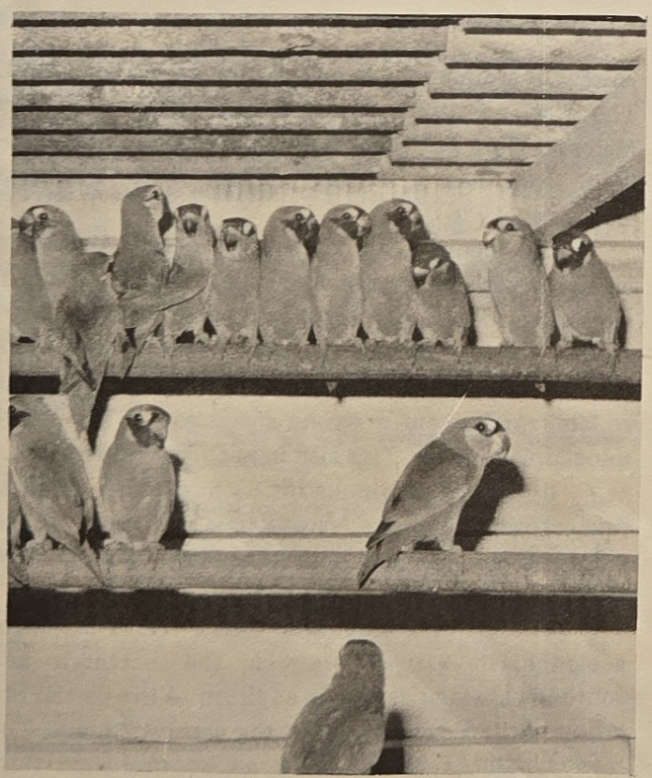
Formerly the whole island was one big natural area where the Papuans lived in close harmony with nature, of which they themselves were an essential part. With primitive weapons such as bows, arrows and spears, and with the aid of dogs they hunted cassowaries, wallabies and crowned pigeons. After the introduction of pigs, they domesticated and hunted those. The agricultural method used was cutting and burning the forest. After producing one crop a new part of the forest was often occupied. The population was in balance with nature and regulated by tribal wars, birth control by plants, and adat law.

Not until the last century was a regular contact between the Papuans and the outside world established. At first missionaries and later government employees settled along the coasts and in the interior of Irian Jaya. Wars and birth control were forbidden and the traditionally wandering people were settled down in villages, easily accessible for Christianization and governmental control. As a result of this, and also because of the improved medical treatment and hygiene, the population quickly increased.

The 20th century also brought in the large, sometimes government-owned, concerns which could invest the necessary capital and knowledge for the exploitation of the natural resources. In the 1950's the exploitation of oil and the selective logging of the forest started, later followed by copper and nickel mining.



Birds of Paradise, captured in the Mamberamo delta. (Photo: van der Zon)

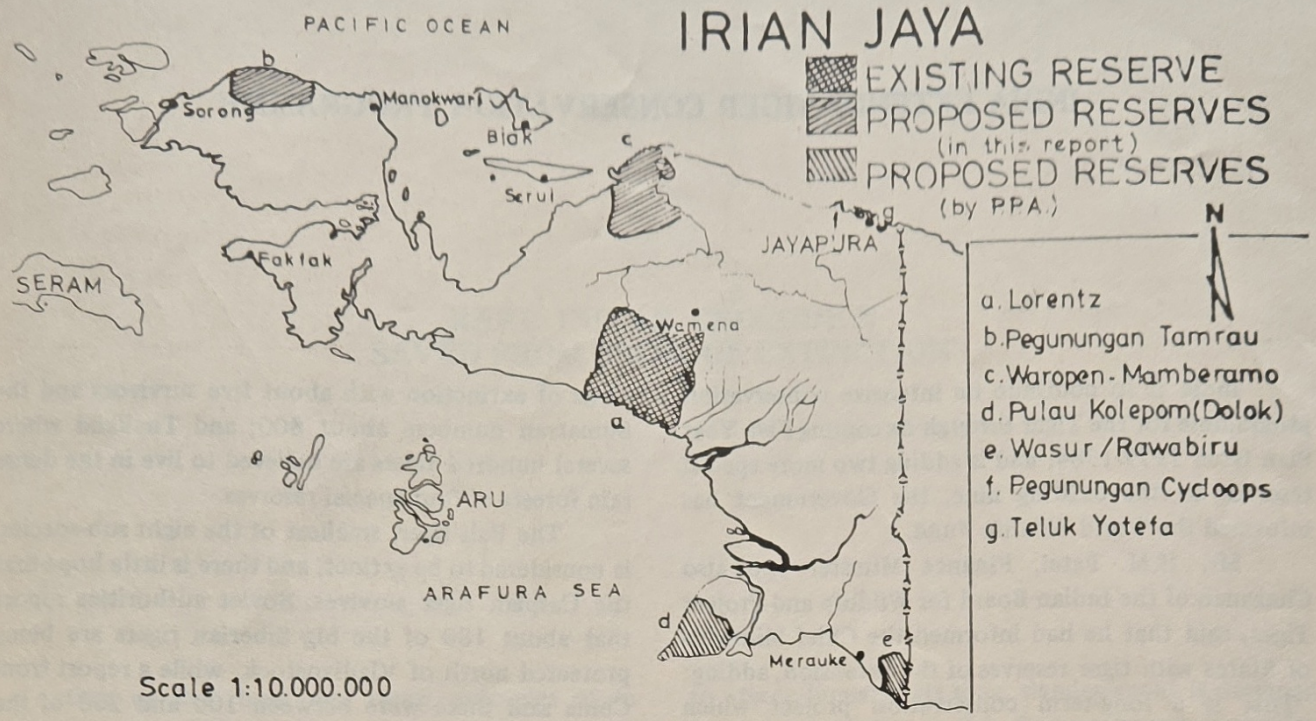


Salvadori parakeets captured in the Mamberamo-delta (van der Zon)

In contrast to Papua New Guinea, where the tribes own the forest, the forests of Irian Jaya are government-owned, based on the forestry law of 1967. All lowland forest of Irian Jaya has been divided into many timber concessions, two of which recently began operations. With the decreasing supply of timber from Sumatera and Kalimantan, the demand for timber from Irian Jaya will become greater and other timber operations will soon follow.

To conserve the rich nature of Irian Jaya, large samples of all ecosystems need to be set aside as natural forest, where no commercial activities should be allowed. Only the local tribes should be permitted to stay and to hunt and gather, provided they employ their traditional methods of hunting. These areas, which will serve as genetic reserves, need to be fairly large with as few people as possible living within their boundaries.

FAO and WWF are assisting the Indonesian government in setting up such a system of reserves. Field trips were made in 1976 and 1977 and will continue in 1978. Two areas were recently established as nature reserves. The Lorentz reserve, Asia's largest reserve, covers 2.16 million ha, including the Puncak Jaya, the highest peak of Southeast Asia, and down to the Arafura Sea in the south. The old Lorentz reserve of 1916 was abolished in 1956 because of the unresolved local rights issue. The other reserve is the



Cycloop Mountain reserve of 22,500 ha near Jayapura. Boundaries for both areas are not well defined and a detailed ground survey is still badly needed.

The FAO Nature Conservation and Wildlife Management project has made proposals for two new reserves:

–The Mamberamo delta

A large, sparsely populated area of mangrove, swamp and dryland forest, including the large Rombebai Lake. The lake has plenty of water fowl such as cormorant, night herons and egrets. In the delta the estuarine crocodile *(Crocodylus porosus)* and the New Guinea fresh-water crocodile *(C. novaeguineae)* were once very common but due to over-exploitation both species are becoming rare. With the establishment of this reserve the crocodile population could hopefully recover and a marvellous part of all ecosystems of the northern coast will be preserved.

–Tamrau Mountains

Located in the northern Vogelkop, this area has a slightly different fauna from the rest of Irian Jaya. Several birds and mammals are endemic here. The Tamrau Mountain reserve with high peaks up to 2,450 m will represent the Vogelkop fauna well, provided it is extended, as is proposed, to the Pacific Ocean coast. Not only are birds of paradise, crowned pigeons, cassowaries and many species of cockatoos, lories, and parakeets common, but wallabies, tree kangaroos and cuscus also occur. The Pacific Ocean beaches inside the proposed reserve are frequently visited by the huge leatherback turtles *(Dermochelys coriacea)*. Unfortunately, both the adult egg-laying females and their eggs are taken by the local people. With the establishment of the proposed area these very rare turtles will also be protected.

Two more reserves, however without a detailed field survey, have been proposed by the government: the savanneous Wasur/Rawabiru area and the swamp island Pulau Kolepom.

Several areas with potential for future reserves should have priority in future surveys. The most important areas are the Kumawa Mountains with surrounding lowlands which has a unique limestone flora and some savanneous vegetation but also splendid lowland forest; a mangrove area on the southern Vogelkop; the famous Arfak mountains and several of the islands. These islands, isolated from Irian Jaya for varying periods of time, have their own species and subspecies. This holds especially for Waigeo, Biak/Numfor and Yapen.

With an increased interest in nature conservation and the people of Irian Jaya, it is to be hoped that sufficient reserves will be established for the conservation of the unique heritage of Irian Jaya.

Mr. Mulyana is with the Nature Conservation Dept., Indonesia and A.P.M. van der Zon is with FAO/UNDP, Nature Conservation and Wildlife Management Project, in Bogor, Indonesia.

INDIA EXTENDS TIGER CONSERVATION PROGRAMME

India is to continue its intensive conservation programme for the Tiger through its coming Five Year Plan from 1979-1984, and is adding two more special reserves to the existing nine, the Government has informed the World Wildlife Fund.

Mr. H.M. Patel, Finance Minister and also Chairman of the Indian Board for Wildlife and Project Tiger, said that he had informed the Chief Ministers of States with tiger reserves of the extension, adding: "This is a long-term conservation project which involves preservation of the total environment so that the tiger, along with its prey and habitat, is preserved at a natural level".

Project Tiger, as the Indian programme is called, was officially launched on 1 April 1973 with eight reserves in representative areas of tiger habitat - Manas (Assam), Palamau (Bihar), Simlipal (Orissa), Corbett (Uttar Pradesh), Ranthambhor (Rajasthan), Kanha (Madhya Pradesh), Melghat (Maharashtra), Bandipur (Karnataka).

The tidal mangrove jungles of the Sunderbans in West Bengal were later included and now the small reserve of Sariska in Rajasthan, and Periyar Wildlife Sanctuary in Kerala are to be added.

The World Wildlife Fund pledged $ 1 million in assistance for Project Tiger, and the funds have provided equipment, such as vehicles, binoculars, cameras, and radio networks, and specialist services to assist in establishing ecological monitoring of vegetation and mammal populations and to train staff in capture and radio telemetry of animals.

While no overall census of tigers has been taken in India since 1972 when 1800 were counted, compared with an estimated 40,000 half a century ago, Project Tiger authorities believe there are sound indications of an increase in numbers in the special reserves.

Apart from assistance to India the World Wildlife Fund is funding tiger conservation programmes in Nepal, where there are about 100 tigers in three reserves; Indonesia, where the Javan tiger is on the verge of extinction with about five survivors and the Sumatran numbers about 800; and Thailand where several hundred tigers are believed to live in the dense rain forests of four special reserves.

The Bali tiger, smallest of the eight sub-species, is considered to be extinct, and there is little hope that the Caspian tiger survives. Soviet authorities report that about 180 of the big Siberian tigers are being protected north of Vladivostock, while a report from China said there were between 100 and 200 of the same sub-species in northern Manchuria. Little is known of the Chinese tiger. The Indo-Chinese race may number up to 2,000 throughout its range from Burma through continental South-east Asia to Vietnam, where it certainly survived the war.

from **WWF Press Release** *No 8/1978*

White tiger, Delhi Zoo (Kuper)

RARE INDIAN CROCODILE SAVED FROM BRINK OF EXTINCTION

One of the finest and rarest examples of an endangered reptilian species, the Indian gharial crocodile, is being saved from almost certain extinction by a team of conservationists led by British wildlife biologist Dr. H.R. Bustard.

Dr. Bustard, who specializes in conserving archaic reptiles, has helped to rear more than 1,500 baby gharials for release into their natural habitat, the Himalayan-fed rivers and streams of northern India. As of March 1978, he had released a total of 71, and plans to free several hundred more later this year.

If, as he expects, the metre-long creatures respond to the call of the wild, then the gharial crocodile – highly prized for its magnificent hide – will teem once more in the Asian subcontinent from which it has almost disappeared.

Dr. Bustard has been working on the problem since 1975 and is acting under a project being carried out for the Indian Government by the UN Food and Agriculture Organization (FAO), with financing by the UN Development Programme (UNDP). The Government of Nepal is cooperating in the work.

The gharial *(Gavialis gangeticus)* is the oldest of the existing crocodiles. Descended from archosaurian dinosaurs, it has changed little in the past 60 to 70 million years and is unique to India and Nepal, where it inhabits the deep pools of the Ganga, Indus, Brahmaputra and their tributaries. It can grow to eight metres in length and its hide is in demand for making some of the finest leather goods. It gets its name from the ghara or bump at the tip of the snout of mature males.

An extremely shy croc, the gharial is not known to attack humans. Its long, slender snout is designed more for snapping on fish than on human limbs. Indeed, crocodiles rarely attack man. Dr. Bustard says children have been known to play unharmed in the same waters with the gharial's cousin, the Indian Mugger.

The gharial's main enemy, according to Dr. Bustard, is man, who has systematically attacked and exterminated gharials in various ways. He has driven them from their habitat by damming the fast-moving rivers which gharials prefer. Poachers raid their nests for eggs, prized as delicacies. Gharials also tend to run afoul of fishermen's nets and drown, or are beaten to death for damaging the net or spoiling the catch. Many have been killed by illegal fishing with explosives. Finally, the demand for good crocodile skins has encouraged a continued and often cruel slaughter.

By 1975, when Dr. Bustard began, only 60 to 70 gharials were left in India. With his help, the Forest Department of the states of Orissa and Uttar Pradesh began a systematic retrieval and hatching of eggs as the first step toward conserving the species. Sanctuaries were established at key river points in various parts of northern India: More are planned.

Dr. Bustard developed a network of specialists who scout for eggs and bring them to the hatcheries for incubation in boxes filled with wet sand. The eggs must be handled carefully since the embryo attaches itself to one side of the shell and if turned over will smother. Dr. Bustard overcame this problem by marking the side of the egg to which the embryo clings. The eggs then must be cozzened in specially-designed

huts where they are kept warm without the need of electricity.

The hatched gharials, fed on fish, are reared until, at about 18 months, they grow to a metre in length and can fend for themselves. The first batch of 26 gharials was released in Orissa state in April 1977 and another 45 were turned loose last February at the various sanctuaries.

The gharials are released on the sandy banks of the backwater pools and inlets formed by the rise and fall of water in rain-fed gorges. Despite concern of visiting officials that they may be swept away and end up in the ocean, they don't go far. In fact, says Dr. Bustard, they slowly explore and assimilate their new environment, getting to know it as a home and haven to which they can return when flood waters rise. And they are not hard to keep track of: the scutes, or scales along their tails, are patterns as distinctive as human fingerprints, and observers who have charted the scutes can identify individuals through binoculars at considerable distances.

The remaining problem is to protect the sanctuaries where the gharials live. The Indian Government has promised to act on this, and the project — which will continue until 1980 and possibly beyond — is training a staff for wildlife protection and conservation.

Dr. Bustard is confident that his baby gharials will take to the wild and spawn a new generation of crocodiles. If so, it will be a tremendous victory, combining environmental considerations with the controlled use of a natural resource which can boost tourism and enhance foreign earnings.

Dr. Bustard, 39, an energetic conservationist who calls himself a "crocodile demographer", was secretary of the Crocodile Group of the International Union for Conservation of Nature and Natural Resources (IUCN) before joining FAO.

He is a firm believer in conservation as distinct from the mere preservation of wildlife and other natural resources. He defines conservation as involving management of the resource for its own kind and for humankind's benefit and enjoyment. Preservation implies keeping the resource as it is, with no modifications whatever, a practice which he finds irrational and counter-productive in the long run.

from **Feature**

Dr. Bustard and V.B. Singh examine young Gharial (Photo: Whitaker)

Flamingos (Photo: Vollmar)

AFGHANISTAN PURSUES WILDLIFE CONSERVATION

by Arun Bhattacharjee

". . . when within two miles of the Ab-i-Estada. . . something red as the rose of dawn kept skewing and vanishing between the sky and water . . When quite close we found these were flamingos. . . not 10,000 or 20,000 but innumerable" - - Babur the Great (1483 –1530)

Five hundred years ago, Ab-i-Estada's flamingo population could very well have exceeded the Mughul emperor's rough calculation. But today, the "bird of flame" is a threatened species, and along with the famous Marco Polo sheep and the Karakoram ibex, the object of frantic preservation efforts.

Years of indiscriminate hunting and destruction of natural habitat have reduced Afghanistan into an almost birdless country. During a four-hour drive on the Chelang road from this capital to the Soviet border, this reporter was struck by the almost total absence of birds along the way.

But the pillage of the wildlife may be ending. With the help of the United Nations Development Programme (UNDP), the Food and Agricultural Organisation (FAO) and the World Wildlife Fund, the Government has adopted a scientific approach to protect vanishing wildlife species and strike a balance between preservation and the need for foreign exchange.

Under FAO and UNDP guidance, the Afghanistan Tourist Organisation (ATO) has set up planned tourist camps for controlled hunting of the Marco Polo

sheep and the ibex, once an exclusive game of the king.

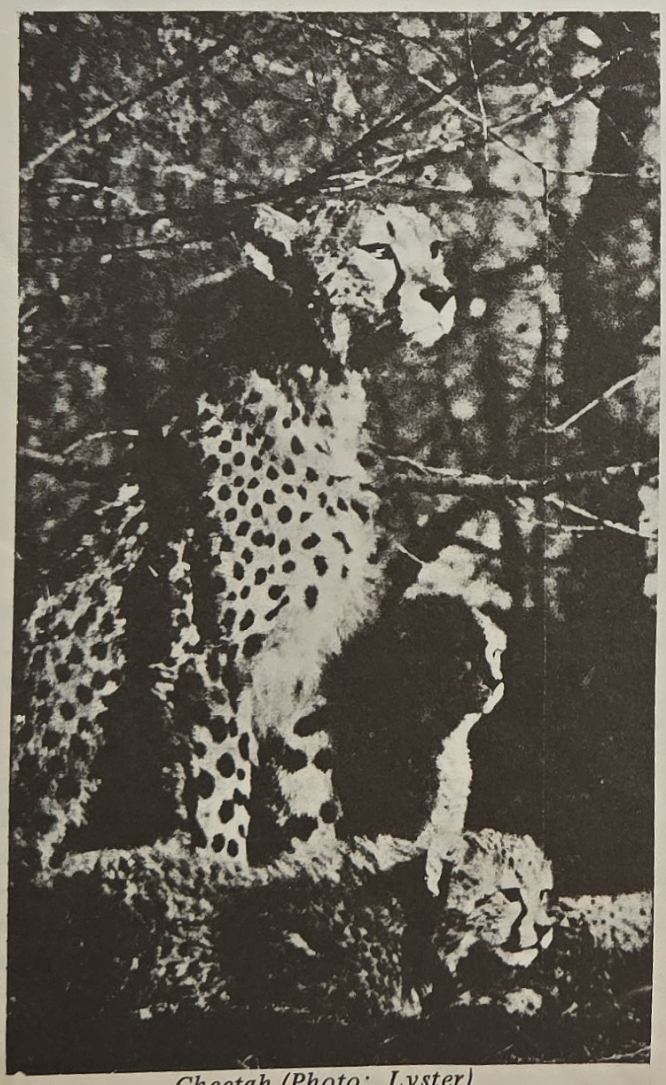
Keeping the desired level of population of the Marco Polo sheep and the ibex is a vital ingredient of the Government's wildlife preservation programme. In the past, many young sheep and ibex died due to shortage of forage. Grazing by Pushtu nomads in the high Pamir plateau, known as the top of the world and home of the Marco Polo sheep and the ibex, has been banned.

The Government allows the killing of only 10 Marco Polo sheep and five ibex annually in the Small Pamir area for which it derives roughly US$70,250.

A new FAO proposal seeks to open the Big Pamir area to hunting and extend the limit to 18 Marco Polo sheep and the ibex to 20.

The Afghanistan Tourist Organisation charges US$6,900 per Marco Polo sheep and US$250 per ibex. It was estimated that by increasing the price on ibex to US$1,000 the country would derive US$ 144,000 annually from both games.

However, Afghanistan is facing strong competition in game hunting from Pakistan which allows the



Cheetah (Photo: Lyster)

Bactrian deer (Photo: Bannikov)

shooting of Markhor goats on its side of the hilly area at US$1,300 per head. Markhor is a wild goat common to the mountainous regions in Afghanistan to India. But hunters still prefer the Marco Polo sheep and Pamir ibex which are found mainly in Afghanistan.

Nevertheless, UNDP and FAO are also helping the ATO to organise markhor hunts in Afghanistan at a flat rate of US$3,500 per head.

A projection made by FAO experts put the total annual earnings from the Marco Polo, ibex and the Markhor at US$252,800 on the first year of the programme.

Another threatened Afghan species which needs careful preservation is the Bactrian deer *(Cervus elaphus bactrianus)*. The rapid depletion of the Bactrian deer population came about when its natural habitat in the northern countries was destroyed by settlers. Natural calamities such as typhoons have also wrought havoc on the deer population so much so that within the Thakar study area, less than 60 animals are known to exist.

The first major preservation campaign in this area started a few years ago in the Ajar Valley in the Bamiyan province which was declared as a deer sanctuary in 1974. The first survey of the Bactrian deer population was made in 1973 with funds provided by the World Wildlife Fund. The Government is also breeding the Bactrian deer in captivity in the Kabul zoo and the Forest Department hopes to introduce it to the Ajar Valley reserves.

Snow leopard (Photo: Schaller)

The wildlife conservation programme also aims to keep the number of animals in the region fully supportable by forage and pasture lands. A FAO wildlife biologist has discovered after an ecological reconnaissance that the ibex population could no longer be supported by the available feed resources of the area. He warned that unless adequate measures were taken, the ibex population could be greatly endangered, and worse, could even lead to the animal's extinction.

A comprehensive study on the country's mammal species was done by wildlife expert Khushal Habibi, a biologist in the Directorate of Wildlife and National Parks in the Ministry of Agriculture.

According to Habibi, at one time, 10 cat species were found in Afghanistan. Of these, the Caspian tiger seems to have vanished totally. Within the last decade not a single Caspian tiger has been found in Afghanistan. The last successful tiger hunt took place 35 years ago in one of the river islands of Darkad on the Oxus river near the border with the Soviet Union.

Indiscriminate hunting and destruction of natural habitat have condemned the Afghan tiger to extinction.

With the rampant destruction of habitat, a number of jungle birds and waterfowls have also become endangered. Hunting has depleted the snow leopard population which are found in the alpine valleys of the Pamir Plateau, the Nuristan Forest and some parts of the Hindu Kush range.

With the destruction of large herds of goitered gazelle in the southern deserts and the decimation of the odd-toed ungulate found only in Afghanistan -- the onager -- their main predator, the cheetah, has also become extinct.

Very few people today know that this beautiful cat ever existed in Afghanistan. A few gazelles still survive in the southern desert but the introduction and persistence of motorised hunting is reducing their chances of survival even more.

Red foxes and Blanford's fox, both considered as rarities, are still found. Eight species of martens are found in Afghanistan but poaching for their valuable skins continues unabated.

The Wildlife Department claims that brown bear and black bear may still be found in the Hindu Kush, Nuristan and Springhar forests, but very few people have actually seen them.

Recently, the Wildlife Department has discovered Dashte Nawar as a flamingo breeding ground situated 135 kilometres away from Ab-i-Estada. Dashte Nawar is potentially a more important breeding ground for the flamingos, as well as other species of waterfowls and waders. That is so because the nearest habitat for the waders is some 600 kilometres away in the Seistan.

Hope of reestablishing a prosperous bird sanctuary soared when 58 other almost forgotten species were discovered. In 1971, a FAO wildlife expert estimated the number of waterfowls and waders on a single day to be around 10,000 in Ab-i-Estada.

Undoubtedly Dashte Nawar is expected to become rich in avifauna once the detailed studies are implemented. Since 1966, several census of the flamingos were taken which give some idea of the flamingos in the area. The 1975 census put the flamingo population of Ab-i-Estada at 7,000 and 9,000 and at Dashte Nawar at 10,000.

With scientific and modern wildlife preservation techniques and strict Government control of flamingo hunting, Afghanistan could succeed in bringing back the "birds of flame" which Emperor Akhbar saw some five centuries ago and make Afghanistan a paradise for birdwatchers from all over the world.

from **DEPTHNEWS Special** *8 September 1977*

PUBLICATIONS

WILDLIFE MANAGEMENT IN WILDERNESS

By C. Schoenfeld and J. Hendee. Boxwood Press, Pacific Grove, California 93950. 172pp. 60 illustrations. $3.95.

The necessity for management of wilderness and/or national parks has been the subject of debate for many years. This publication is an easily readable presentation of the insights of many wilderness and wildlife writers——Durward Allen, McTaggart Cowan, L.C. Merriam, Jr., A. Starker Leopold, Ray Dasmann, Aldo Leopold, John P. Milton, Val Geist. In drawing extensively on the field experience of researchers and managers, it demonstrates that management is essential if the wildlife values of wilderness are to be retained.

The monograph speaks primarly of United States experience in implementing the 1964 Wilderness Act. It therefore focuses on US agency policies and the species for which they are responsible. However the book does provide universal food for thought and is a handy refer nce work for manager and student.

from **IUCN Bulletin,** *December 1978*

INTERNATIONAL EXPERIENCE WITH NATIONAL PARKS AND EQUIVALENT RESERVES

1978. Edited by J.G. Nelson et al. University of Waterloo. 53 tables and charts. 603 pp.

A product of the 1976 Man and Environment Commission, International Geographic Union, Rostov, USSR, the papers in this volume are intended to provoke critical thought about the whole concept of national parks and the range of choices that are open to management.

Case histories are presented from Canada, Colombia, Costa Rica, Denmark, England, India, Iran, Nigeria, Norway, USA, USSR. A similar format is used throughout, so enabling comparisons to be made.

Some interesting conundrums emerge. For example, Denmark comes out worst from the point of view of past action but perhaps best from the point of view of future planning. Denmark today has "virtually no natural vegetation" but on the other hand "landscape planning via nature parks is regarded as an integrated component of total physical planning".

In brief the book provides many alternative approaches. The technical solutions are available. The question remains——will they be implemented?

from **IUCN Bulletin,** *December 1978*

PROTECTING NATURAL AREAS – AN INTRODUCTION TO THE CREATION OF NATIONAL PARKS AND RESERVES

1978, Philip W. Quigg. National Audubon Society, 950 Third Avenue, New York, NY 10022, U.S.A. 44 pp., in English, French and Spanish editions. Free.

This is an attractive and useful booklet. It is the third in a series of international publications produced by the National Audubon Society as a contribution to the better understanding of worldwide natural resources conservation needs and programs.

The material in the booklet ranges from a lucid recital of the reasons for protecting natural areas to a comprehensive review of sources of information and organizations, international, governmental and private, that can be of great assistance to those concerned with environmental protection and human well-being. Although it is aimed primarily at individuals who are not professionally engaged in conservation work but who have a need-to-know the fundamental relationships, between economic development and the world around them, this reviewer believes the information will be of significant value to professional conservationists as well. It brings together in a convenient form basic information that the professional often finds himself searching for.

The conflict between development and the well–being of our natural environment is no stranger to most of us. It is helpful to have this conflict reduced to its simplest terms so that both sides can find ways of reconciling their differences.

Of particular value to many readers will be the descriptions and discussions of the existing and potential international conventions and treaties that now give promise to better international understanding and cooperation. More pragmatically, the ideas presented on how to proceed, both nationally and internationally, with the task of protecting man from himself and preserving a world of beauty and sustained utility are refreshing as well as challenging.

Gordon Fredine

from : **Parks.** *Vol. 3 No. 3 Oct., Nov., Dec. 1978.*

WORLD DIRECTORY OF NATIONAL PARKS AND OTHER PROTECTED AREAS – SECOND ISSUE, 1977

International Union for Conservation of Nature and Natural Resources, Morges, Switzerland. Volume II, looseleaf cover and 397 new and replacement sheets. US $60. post free. Two-volume set, complete, US $ 85.

The second instalment of 397 World Directory loose-leaf sheets, together with the 250 sheets of the first issue published in 1975, completes the two volumes of this indispensable reference book for all workers in the national parks field. It covers a further 43 countries, bringing the total number represented in the Directory to 60.

Data sheets are the heart of the Directory. They are simple, direct, and about as complete as one would hope for. Careful editing holds the data contained in 21 standard entries to the front and back sides of the sheet devoted to each area. Usual entries cover name, type, biotic province, date established, location, altitude, zoning, staff and budgets. More elaborate treatment is given to land tenure, physical features, vegetation, noteworthy fauna, disturbances or deficiencies, tourism, scientific research, special scientific facilities, and principal reference material. As a final helpful note, often absent in other publications, each sheet provides a mailing address for the local park administration.

The Directory was published with the financial assistance of the World Wildlife Fund and UNESCO.

from: **Parks**, *Vol. 3 No. 3 Oct., Nov., Dec. 1978.*

FIRST INTERNATIONAL PHEASANT SYMPOSIUM

The World Pheasant Association, in association with the Wildlife Department of H.M. Government of Nepal, is arranging a "First International Pheasant Symposium" to be held in Kathmandu on 21st – 23rd November 1979.

The objective is to bring together wildlife department officials, field scientists and people interested in the conservation of the pheasants, from throughout the Asian countries that form the homes of all but one of the pheasant species.

Pheasants are WPA's prime objective, but it is hoped that this unique symposium will provide the opportunity for exchange of information on wildlife conservation problems of all sorts throughout Asia.

Delegates from many countries have already accepted invitations to attend. WPA is taking the opportunity of building around this Symposium a really wonderful and economically attractive holiday for its members.

For those leaving from London the start date will be 17th November 1979 and return date the 1st or 3rd December 1979. Costs for the entire fortnight will be around £875 inclusive of air fares.

The fortnight will commence with a visit to the famour Tiger Tops Jungle Lodge in the south of Nepal with which no place on earth can compare! Transport from the airport to Tiger Tops is on elephant back which creates little disturbance and increases the chances of observing the wildlife of the area. Early morning elephant rides provide the opportunity of seeing the Asian Rhinoceros as well as other species of animals and birds. Tigers cannot be guaranteed, however Peafowl and Red Junglefowl abound and Leopard may also be seen.

The two working days Symposium will be held on the return to Kathmandu and this will be followed by a flight up to Lukla airstrip at 9,500 feet, which is the starting point for a special pheasant trek. It is very likely that both Blood pheasants and Himalayan Monal will be seen during the course of the seven day trek that is planned. The trek will include a visit to the famous Buddhist Monastery of Thyanboche from which Mount Everest can be viewed and the Monastery of Pangboche which houses what is claimed to be a Yeti scalp.

It will be possible for a limited number of delegates to the Symposium to participate in the pheasant treks and visit to Tiger Tops. For details and costs of the Symposium and optional treks contact – Keith Howman, Secretary Overseas Projects, World Pheasant Association, Ashmere, Felix Lane, Shepperton, Middlesex, England, U.K.

from: World Pheasant Association bulletin

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